Empowering the healing environment, a holistic approach

Name: Jaap Koopmans
Student number: 4555953

Graduation Studio: Architectural Engineering
Tutors: Ir. Annebregje Snijders (AE design tutor)
& Dr. Andy Jenkins (research tutor)

//Introduction

The Dutch healthcare system is undergoing a lot of changes, due to the developments in human health such as the upcoming and experienced treats of pandemics and the technological progress within the medical world. According to the Dutch National institute for Public Health and the Environment (RIVM,2018), there will be an increasing amount of people suffering from chronic illnesses since the illnesses of today that would be fatal, will slightly become more treatable and chronic in the future. Moreover, the healthcare system itself gets more decentralised. The generic hospital will become more specialized on the clinical operations, while the post-treatment of patients will more occur outside the hospital. In other words this is sometimes called the 'zorg op maat' or customized care as healthcare gets more focused on the specialised demands of the individual. Another aspect is the growing attention to the effects of the environment on people's health. The latter one being more present in places where urbanization takes place at a significantly fast pace, results of such areas could result in 'unhealthy' consequences for the inhabitants such as lung problems but also mental disorders (Flies. et al., 2019). Side effects of this last development could be the fragmentation of 'healthy' and 'unhealthy' neighbourhoods within cities (RIVM, 2018). Besides, the fact that there is a large amount of vacant buildings within these inner urban environments where discussions arise about demolishing or transformation/renovation. Whilst total demolition is creating a larger amount of demolition waste which eventually can have a negative impact on the environment (van der Voordt, DJM., 2007).

It is this environmental development in which architecture can interfere. Especially in a current situation where e.g. hospitals were mostly build as strictly clinical and functional with a focus on high productivity of treating sick people (van den Berg, 2005) which might not fit the needs for future projects and as well might not benefit the health of the users. A contemporary answer that architecture has been giving to this, is the growing demand in evidence based design. With this approach, the potential is being investigated on how the architecture of a healthcare type building can be of value for the medical well-being of users inside a healthcare building. This introduces the creation of a so-called healing environment. A term that houses some abstraction as it cannot be seen as a generic concept which can be implemented in every design project due to the abstract characteristic of the definition. This makes the healing environment an ongoing development in itself which might ask for a more holistic approach. According to the Cambridge dictionary, holistic stands for ''dealing with or treating the whole of something or someone instead of just a part of it''. This can be related to a more user-centred approach which is also an ongoing trend within the built environment (Watson, 2018). In this way the specific needs of the individual, or user, are treated as leading within the forming of a treatment plan. The latter approach can also be of value for the design process itself.

An example of a building type which could use the benefits of the healing environment is the rehabilitation clinic. A centre which will become of greater value in a context where hospitals become more focused on only the clinical operations and where an increasing amount of people have to learn how to cope with their chronic illnesses. Examples of healing environments as guiding design theme within a rehabilitation clinic are Groot Klimmendaal in Arnhem (Netherlands) or the Maggie Centres across England. It is the challenge to combine

the possibility of giving the healing environment a more user-centred approach together with the occurring trend of making urban areas more 'healthy'. So to say, situating the healing environment within an urban context. This brings up the overall design question of this research: **In what way can the healing environment as an user-centred design approach of a rehabilitation clinic within an urban context be of value for the (medical) well-being of the users and its surrounding context?**
Rather than only naming the general design elements that can be used to benefit the well-being, this research will also focus on the material side of the healing environment and the technical challenges that are related to the implementation into existing buildings. The three sub questions related to this are:

Sub-question 1: Which already known architectural design aspects from the healing environment are there to benefit the medical well-being of humans and how are they implemented into the realised design of existing projects?

Sub-question 2: In what way can the materiality of the researched architectural design elements empower the efficiency of the healing environment and can this be achieved with attention to circularity? Especially when tested in determined spaces within the clinic, to name: an (public) entrance area; a common hallway and the PMT (Psycho-motoric therapy) treatment spaces. PMT can be seen as a relatively new form of physical treatment to mental difficulties (UMCG, z.d.). The PMT-treatment is chosen because of its multiple character, on the one hand calming to provide confidence with the therapist but on the other tantalizing in a way that it motivates the client to cope with its incapabilities (M. van der Linden, personal communication, March 30 2022). Thus forming the challenge to create an environment in which this can take place in combination with the general requirements in terms of functionality. This can also be related to the more generic theme of flexibility.

Sub-question 3: Which technical challenges are connected to the integration of this design approach within an existing building as part of reusing vacant post 65 buildings within the inner urban context? This sub-question is more connected to the design phase of the graduation project.

By answering these questions, it is suspected to get more insight into how to use the different researched design tools and materiality of the healing environment within the context of the urban rehabilitation clinic. Eventually, interfering on the health- and urban challenges that are faced in the upcoming future.

//Theoretical Framework

The research theme 'healing environment' is not something new. It is actually rooted in long-standing traditions of the complementary medicine and holistic healing (van den Berg, 2005). Although it is not a new concept, its increasing attention from the architectural field seems to be of a contemporary kind. Especially in the medical field, where healthcare administrators and medical professionals are getting aware of the need to design healing environments in which patients, family and staff will be supported by their direct surroundings while still being treated (Berg van den, 2005). This trend is also described by Zborowsky & Kreitzer (2008) where they describe the shift of healthcare organizations to more patient-centred models, in which the environment takes a key role in the healing process of the individual. The 'classical recipe' for the healing environment described by van den Berg (2005) consists of four key architectural elements to name; nature; daylight; fresh air and silence. Although this seems like a clear definition, the healing environment cannot be seen as a generic concept, rather one with a more nuanced character which is related to the specific needs of the users or patients as an healing environment is different for everyone. This is why the creation and definition of the healing environment can in essence be connected to a holistic approach as it is already related to a holistic healing principle (Sakallaris et al., 2015).

This holistic approach can be connected to the fact that there is an increasing demand in user-centred environments. This is also related to evidence-based designing. The translation of this design approach to experts and non-experts is still an ongoing challenge (Watson, 2018) where the shift from admin- to more user centred buildings asks for more collaboration with the end-users of the building such as patients and staff. The latter is also pointed out by Choong in Jurnal Teknologie (2015) who as well states that this can potentially help in measuring the effectiveness of the healing environment. Satisfaction rates of the users can be surveyed which can then say something about how the environment is perceived. This individual experience can then be evaluated on the basis of the eventual goal of the healing environment, which could be defined as the creation of spaces where patients' recovery, well-being and experience is supported by their direct environment in such a way that it benefits the healing process (RIVM, z.d.).

The role of materials in these 'healing' spaces could be seen as another key element within the challenge of making the healing environment a sharper definition and also more applicable. Although it seems that this material factor lacks research in this field according

to the used literature. The materiality factor can be related to what role it plays in reducing the stress factors and making people feeling more at ease within their surroundings. In this research, material factors are discussed and questioned as part of a total spatial experience by the end-user that needs to be achieved to form a functioning healing environment.

The term 'well-being' has an important role in measuring how the healing environment is working. Especially within healthcare buildings, it can also be seen by the amount of postoperative complications and taken pain killers by patients as this is one of the positive outcomes researched by Ulrich (1984). The latter one being only applicable if the design is already realised. Another, more practical way, could be taking surveys consisting of multi-item scales which is e.g. described by Watson (2018). Measuring well-being and its effects on the performance of the building might require new definition methods of measuring well-being which will be partly discussed in this research but eventually will need more in-depth research. Therefore this research focusses more on the material factors in relation to the total spatial experience which is based on the needs of the users in combination with existing questionnaire models. In this case, patients of the researched PMT room, therapists, experience experts and other experts from the medical field.

//Methodology

To answer the main question, the research is split up into three sub-questions. One focused on the definition of known design aspects which can be used to design a healing environment, another on the technical challenges of implementing such a design into an existing building (this will be more present in the design process itself) and the latter focused on the materiality of the healing environment and its usability. It will be tested if a determined spatial and architectural experience can be achieved by the application of certain materials and design aspects in combination with a questionnaire which focuses on the well-being. This is done to eventually form more understanding on how to make the healing environment more easily usable for the application to a rehabilitation clinic within an inner urban context.

For the first part of the research, case studies will be performed on existing realised projects with a special focus to their use of principles from the healing environment. These case studies will be performed by looking at the use of the key elements described earlier (nature, daylight, fresh air and silence). It will also be researched how their spatial design is formed, how are the different functions connected and in what form. This is related to the more urban-used space syntax analysis method (Haq, S., & Luo, Y., 2012). The case studies will have a specific focus on the related key spaces described earlier. Moreover, a literature research will be done to provide a more basic insight into the possible architectural implementations of the key elements from the healing environment and their already proven effect on the well-being of people.

Whilst the spatial analysis and organizational dimension of the case study research shows the more 'general' elements and application of the healing environment, the second sub-question focuses on the materiality of these design aspects. In short this will focus on how different materials can shape a certain experience which is needed in certain spaces of the design project, in this case the entrance, common hallway and PMT treatment spaces. What is needed for the creation of medical well-being will be complemented by interviews with experts from the medical field as well as potential examples of end users e.g. PMT clients, rehabilitation patients, practitioners and therapists who are involved in the design program of the rehabilitation clinic. They will be asked to tell more about what they need in terms of providing treatment and what the patient or clients wants to feel at ease. Thus focusing on the medical application rather than the architectural demands. However, the outcomes of these interviews will then be translated to design requirements. Subsequently, a material research is done with existing literature on how certain materials benefit the creation of certain feelings and emotions which will be needed in the studied spaces of the rehabilitation clinic program.

Materials are categorised in a spectrum of sterile to biophilic and then described by their capabilities of creating (a part of) the needed architectural experience. Eventually, a material palette will be put up which shows how each studied material can be combined to fit the needs of the determined spaces which can then be used in the virtual mock-up. This virtual mock-up will be created within a software that provides the functionality to transform the modelled space into a VR-ready environment (e.g. Enscape). Each determined room will get different iterations which are tested as a total experience hence firstly showing the entrance, then the common hallway, finally the PMT treatment spaces.

The different iterations are based on the previously mentioned spectrum which consists of two extremes to name biophilic and sterile. For example room 1 will be with more 'natural' elements which creates a more biophilic atmosphere. Room 2 will then have more sterile elements. Eventually there could be around five iterations for each researched room which will go from a biophilic- to a fully sterile atmosphere.

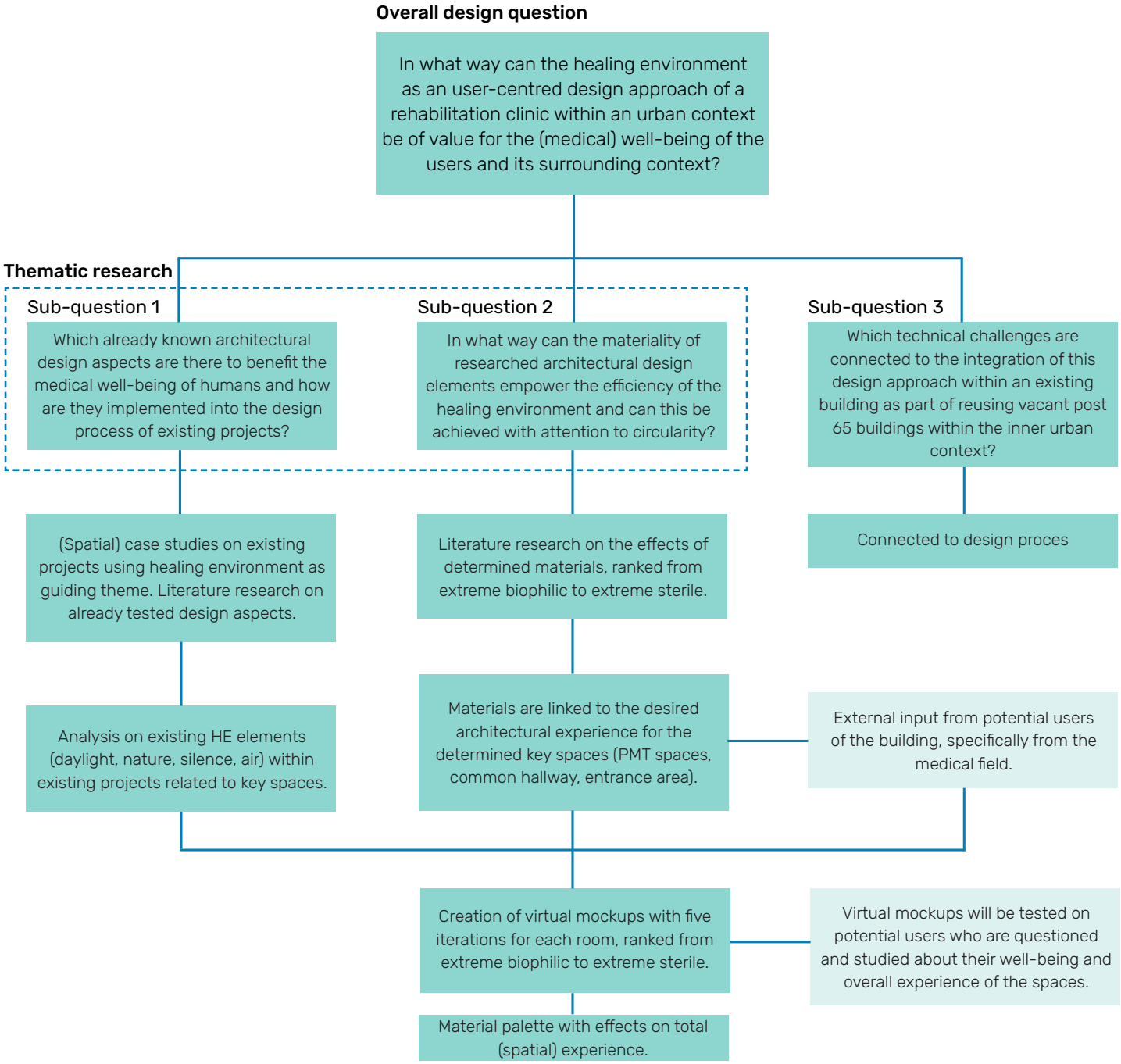

Figure 1: Schematic of overall methodology

The test-persons will consist of students but also experts from the medical field who are involved in the program and potentially even rehabilitation patients. These persons will be asked to fill in a survey which questions the generated experience. This can be based on existing models of measuring well-being inside the built environment, e.g. a multi-item scale (Watson, 2018). It is also a possibility to study the more unconscious stress-related factors such as heart-rates (Taelman et al., 2009) and how long people want to stay in a certain test room or what they look at. This can provide more direct input for the overall results. These unconscious factors need more initial research to be specifically determined. Results from the virtual mock-up will be described in a report and then reflected and discussed on their relativeness to the design project. Eventually forming a material palette which shows the effects of certain material application on the overall (spatial) experience of the space. This can be related to the sub items of well-being mentioned in the multi-item scale by Watson (2018). See **figure 1** for an overall overview of the research methodology.

//Expected Findings

With the described methodology, the overall research question will be partly answered in an elaborate and descriptive way of how to apply the researched themes on the upcoming design process. Also how the architecture can eventually benefit the (medical) well-

being of the users by reflecting the test results against the needed spatial experience and the taken survey. This can also lead to the formation of a tool-kit which gives insight into the more holistic approach of designing a healing environment. Finding what a building needs in terms of experience by its end-users could generate a more well-functioning healing environment rather than implementing a generic concept. This will also emphasize the shift from admin-centred to user-centred buildings. Thus expected is to emphasis the definition of the healing environment as a more nuanced holistic architectural term. At first something which seems hardly understandable and applicable because of its abstract character, but when taken into this research showing more of a practical way of application with the researched key elements and the material palette. When applied for this specific design project, it can also give insight into how to apply it on other projects as well. Combined with making it applicable within existing buildings as part of urban improvement, these insights contribute to the contemporary challenges of Dutch healthcare architecture and future healthcare projects.

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