

## Architecture is not a result of an evidence-based design process

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### Introduction

In order to design a building, architects conduct research. Research in the architectural practice can be understood as a process of collecting data, processing it using a certain method, or combination of methods, and arriving at a model or drawing. There are roughly two ways of conducting research, by application of an existing model to a new set of circumstances, or by developing a new framework of existing facts.<sup>1</sup> This process of conducting research, is also designed. This is problematic, as the choice of which information is taken into account, and through which method(s) this information is processed, highly influences how designers see the problem. Research is thereby not value free.<sup>2</sup> Architecture is directly concerned with the spatial layout of the environment and has a great impact on the daily lives of people. Thereby it's not only necessary to understand the architects design methodology, or how architects conduct research to arrive at a design proposal, but also architects research-methodology, or the origin and motivation behind architects used methodology in establishing facts.<sup>3</sup> Architects are not always aware about why they use a certain methodology, and how it limits or frames their understanding of the problem they try to solve. So, it is necessary for architects to have a broader understanding of the role of research in the architectural discourse. In this way they can be more conscious of how and why they conduct research and how they position themselves in the architectural discourse.

I am glad that I followed the course Research Methods at the TU Delft. One of the aspects of the course that was most illuminating for me, is that I learned that many architects and artists struggle with how to position themselves, as their design process is a combination of rational and more intuitive decision making. As a student architecture I also struggled with the notion of having to rationalize certain design decisions or tendencies. My designs had besides rational also intuitive aspects to it, which were hard to explain. The emphasis in the academic discourse was to formulate the design process as a process of rational decision making, so to cope with that I sometimes caught myself in the act of deliberately falsifying my design process in retrospect, to justify a certain design outcome. The lectures and discussions during this course made me more aware of these tendencies and showed me that I am not the only one that struggles how to deal with these contradictions in the design process.

The way architects position themselves often is problematic. Even architects that belief to have a rationalist approach often exhibit experimental and intuitive tendencies. The same counts for architects with an empiricism approach, still also have rational aspects in their design process.<sup>4</sup> It's common among architects to hold two different sets of theories. One theory, that the architect is espousing and communicates to others, and the other is the theory that actually governs his actions, called theory of action.<sup>5</sup> This inconsistency in architect's espoused theories and theories in action, is not necessary a bad thing. However, this inconsistency should be recognized as part of the complexity of being an architect, and not be snubbed upon.<sup>6</sup>

This realization that inconsistencies in beliefs and tendencies in the architecture practice, is rather common and not necessary a bad thing, made me rethink my own design-methodology for my graduation.

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<sup>1</sup> Ray Lucas, *Research Methods for Architecture*, ed. Laurence King Publishing (London2016), p.7.

<sup>2</sup> M Berkers and R Gorny, "Lecture Series Research Methods; Course Description " (TU Delft, 2018).

<sup>3</sup> Ibid.

<sup>4</sup> Royston Landau, "Notes on the Concept of an Architectural Position," *AA Files*, no. 1 (1981): p.112.

<sup>5</sup> Argyris and Schon, as cited by *ibid.*, p.113.

<sup>6</sup> Ibid.

My graduation lab, Health@BK, is concerned with architecture for health care and puts the emphasis on the ratio. The lab is the first interdisciplinary graduation lab, it strives for user-driven design and research and working with evidence in design solutions.<sup>7</sup> The latter, commonly known as Evidence Base Design (EBD) is a design method often used in the design of healthcare facilities and environments. An important part of this method is using scientific evidence concerning wellbeing of people in the built environment. However, not only quantitative evidence is used in this method, but also qualitative evidence. Quantitative evidence concerns objective evidence, like questionnaires, (large) databases and empirical evidence. Qualitative evidence is more subjective, like using interviews or research through design.<sup>8</sup> This makes using this method somewhat problematic. Also, the fact that many aspects of building design are not directly addressed by EBD, such as how to deal with the context of the site or the materiality and construction of the building. Yet these are aspects all buildings deal with. So, my hypothesis is, that a building designed only by using EBD could not exist, as there are many aspects of buildings and the built environment that are not supported by (scientific) evidence. Architects using EBD in the design process, must therefore base certain design decision, consciously or unconsciously, on their own preferences or intuition.

This leads to my research question:

*How does intuition or artistic expression go together with the methodology of EBD?*

The main research question is answered with the following sub-questions:

- *What are the methods of EBD?*
- *How does EBD deal with intuition or artistic expression?*

The objective for the design process of my graduation project, is to allow myself to express what makes me unique as a prospective architect, without abandoning the EBD principles. Secondly, I would like to use my intuition consciously as a method in the design process. In this way I would not only understand better what my own (hidden) tendencies are, but also to see if this could be a useful method for other practitioners of EBD.

### **Research Methodological discussion**

My graduation project is about redesigning homeless shelters in Rotterdam using the EBD principles. The current research approach is rather comprehensive, as besides creating my design solution, it also includes the writing of my own list of requirements or design brief. The design brief will be created using the conclusions of a context analysis and conclusions of a subjective analysis of my own objectives. The context analysis will include the analysis of the homeless shelters in Rotterdam, the target group and the location. The methods used for this analysis will be literature studies and field work. The literature studies will be conducted to get all the relevant data about the users, the current government policy, and best practices. The fieldwork will consist of observations, interviews, questionnaires, sketches and typological studies.

My own objectives are mainly concerned with the tectonics of the building. I will analyze how my own objectives have been realized in a view chosen case studies. These will lead to conclusions which will be included in the design brief as architectural and programmatic requirements.

After I have constructed a design brief I will start with the design process. This process will consist of developing alternatives and present them to the users for review. Based on the review I will choose the best one and make a detailed version.

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<sup>7</sup> Luc Willekens, Jelle Koolwijk, and Clarine Van Oel, "Health@Bk Graduation Manual 2018 2019," (TU Delft, 2018), p.7.

<sup>8</sup> Ibid.

My research methodology is concerned with methods from EBD. Therefore, the main literature I will use will be based on EBD.

For the general information about EBD I will use the following sources:

- A Visual Reference for Evidence-Based Design (2008)
- Understanding healing environments: effects of physical environmental stimuli on patients' health and well-being (2009)
- An Introduction to Evidence-Based Design: Exploring Healthcare and Design (2014)

The pioneering study by Professor Ulrich, that formed the basis for EBD:

- View through a window may influence recovery from surgery

I will also use literary reviews regarding EBD research, as the conclusions from those reviews will serve as evidence for my design concepts. The two most important literary reviews from EBD are:

- Effects of Healthcare Environmental Design on Medical Outcomes (2001)
- A Review of the Research Literature on Evidence-Based Healthcare Design (2008)

To address the current development and discussion of EBD in architecture, I will also include:

- Evidence-Based Design: Theoretical and Practical Reflections of an Emerging Approach in Office Architecture (2009)
- Does evidence-based design for healthcare-built environments limit creativity (2011)
- Evidence-Based Design in Learning Environments: A Practical framework for project briefing (2014)
- Seeds Of Change: An Interview With Roger Ulrich (2015)

Besides EBD I also have my own objectives concerning my research methodology. These objectives are concerned with expressing of meaning through architecture. I want my design to be something more than only the result of practical and rational considerations. Therefore, I also want to research how other architects have used this more intuitive aspect in their design approach.

### **Research-Methodological reflection**

Evidence-based design (EBD) is a research methodology that originates in healthcare. Research has showed that the environment can have a huge impact of the wellbeing of people. Well-designed healthcare environments have proven to evoke positive emotions and reduce stress in patients, which improved the healing process and dealing with chronic disease. Such environments serve the psychological needs of the patients and positively affect their health and wellbeing.<sup>9</sup> So, it is important for designers and other stakeholders of healthcare facilities to understand how to design such psychology supportive or healing environments.

Evidence of early attempts to create such healing environments can be traced back to ancient Greece. In the Asclepion hospital, built in the sixth century BCE, the patient rooms faced eastwards to the upcoming sun. This intuitive design decision proved to be quite significant for patient's wellbeing, as the hospital was the most celebrated in the classical world.<sup>10</sup>

Hospitals and other healthcare environments, have until recently not been designed using research findings regarding user's wellbeing. In designing such environments, architects mostly relied on their intuition, previous design experience, the experience of their client or changes in technology.<sup>11</sup> This started to change from the 1970s. The Evidence-based movement began with the will to improve

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<sup>9</sup> K Dijkstra, "Understanding Healing Environments : Effects of Physical Environmental Stimuli on Patients' Health and Well-Being" (University of Twente, 2009), p.11.

<sup>10</sup> Eileen Malone et al., *An Introduction to Evidence-Based Design: Exploring Healthcare and Design* (Center for Health Design, 2014), p.2.

<sup>11</sup> Ibid., p.2

patient-care, by collecting evidence from randomized control trials, and establishing research methodologies.

Professor Roger Ulrich is an important man in the evidence-based movement. His pioneering study from 1984, "View Through a Window May Influence Recovery From Surgery" has proved that small changes in the environment can effect patients restorative ability. In this study, Ulrich observed the recovery of patients who recovered from surgery. One part of the patients recovered in rooms with a view on trees, and the other in rooms with a view on a brick wall. The difference in recovery was remarkable, as patients with a view on natural scene "had shorter postoperative hospital stays, received fewer negative evaluative comments in nurse' notes, and took fewer potent analgesics..."<sup>12</sup>

According to Ulrich, ninety percent of good research were published in medical and scientific journals, which architect normally don't read.<sup>13</sup> That's why it is important to collect and evaluate these findings and translate them as design guidelines to architects and other stakeholders in healthcare design.

The Center for Health Design (CDH) founded in 1993, is a movement for creating healthcare facilities that promote healthier environment for patients and staff. One of its objectives is to collect new knowledge from many different fields, such as neuro-science, behavioral architecture, biology, psychology, neuro-immunology, and make it accessible to architects and designers.<sup>14</sup> In 1996 they published the first literature review of 84 relevant research. In 2004 another extensive literature studies were conducted of 600 additional sources. The latest was in 2008. Both the literature research of 2004 and 2008 were conducted by Ulrich and his team.

Important findings from those studies resulted in supportive design guidelines, concerning "environmental characteristics that support of facilitate coping and restoration with respect to the stress that accompanies illness and hospitalization".<sup>15</sup> This process of supportive healthcare begins with eliminating environmental stimuli that are known to be stressful, like loud noise, and including aspects in the environment that calm patients down and reduce stress. The latter includes adding windows with nature view, art or plants in the patient rooms. The main guidelines for creating supported environment consist of:

- Foster control, including privacy
- Promote social support
- Provide access to nature and other positive distractions.<sup>16</sup>

As we can see some guidelines are more challenging to achieve by architecture, and are more concerned with interior design, ambient aspects or care.

An important notion for architects and designer is to be careful with own design preference. In a research about art in patient rooms, patients recovered faster when exposed to art and pictures depicting nature, and patients exposed to abstract art dominated by rectilinear forms had less favorable recovery than patients in the control group with no pictures.<sup>17</sup>

The guidelines can be used as part of evidence in the design process. According to CDH a typical Evidence-based design process has the following 8 steps:

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<sup>12</sup> Roger S. Ulrich, "View through a Window May Influence Recovery from Surgery," *Science* 224 4647 (1984): p.420.

<sup>13</sup> Kristen D. Zeit, "Seeds of Change: An Interview with Roger Ulrich," *HCD Magazine* 2015.

<sup>14</sup> Malone et al., p.5.

<sup>15</sup> R.S. Ulrich, "Effects of Healthcare Environmental Design on Medical Outcomes," *Design and Health: Proceedings of the Second...* (2001): p.53.

<sup>16</sup> *Ibid.*, p.54.

<sup>17</sup> *Ibid.*, p.55.

- Devine evidence-based goals and objectives
- Find sources for relevant evidence
- Critically interpret relevant evidence
- Create and innovate evidence-based design concepts
- Develop a hypothesis
- Collect baseline performance measures
- Monitor implementation of design and construction
- Measure post-occupancy performance result<sup>18</sup>

However, not all practitioners of EBD follow all the steps. There are four levels in which practitioners can operate:

- The first level practitioners use the latest literature in the field for their project and by applying those, they are developing new examples for others.
- Second level practitioners also hypothesize expected outcomes of the design interventions, and plan to measure the results.
- Third level practitioners besides applying latest evidence form literature, hypothesizing expected outcomes and measuring the results, also report their findings publicly.
- Fourth level practitioners follow the steps as mentioned above and publish their findings in peer-reviewed journals.

Designers and architects that only use findings from EBD subjectively to support their design after completion, are called level-zero practitioners.<sup>19</sup>

If we look at the design process of EBD, we can see that finding and interpreting of research are big aspects of the process. They result in guidelines that are used to create preliminary design concepts. Another important part of the EBD- process is to monitor and measure after the healthcare environment has been completed. So, it's safe to say that a fourth-level EBD-practitioner is not only an architect but also a scientist.

Although EBD seems like a promising tool for architects to make informed design decision and to become part of innovation, many architects are not too excited about EBD. Since the 1990s architects have criticized that EBD was going to constrain creativity and get in the way of innovation. Some worried that it would be prescriptive or too scientific, and eventually marginalize the role of the architect compared to other stakeholders.<sup>20</sup>

Ulrich however doesn't agree and advocates the opposite. Thanks to EBD, the quality bar has been raised in design specifications for new projects, with often increased budgets. Using the EBD guidelines to come up with a new solution that performs well, actually requires a lot of creativity. Ulrich even states that many design innovations probably would never have occurred if designers had not been informed by research and performance thinking.<sup>21</sup>

For my own graduation project, I will definitely use the latest evidence and design guidelines to create a supportive environment. However, I am not planning actually hypothesize and measure the results, as my graduation project is a speculative one. So, as I see it, I am a first level practitioner. I do however think that creativity and intuitive design is somewhat problematic in EBD. As research showed with the abstract artwork, the average patient has a different taste and different sensibility to artistic expression than the schooled designer. I think because of that, and because of the fact that patients are extra sensitive to the environment, that the taste of the patient should be leading in the

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<sup>18</sup> Malone et al., p.9.

<sup>19</sup> Hamilton as cited by J. Malkin, *A Visual Reference for Evidence-Based Design* (Center for Health Design, 2008), 3.

<sup>20</sup> Zeit.

<sup>21</sup> Ibid.

design of a building. This somewhat limits the design freedom of the architect, even if the guidelines for supportive environments are followed.

An issue with the EBD process, is that it makes it seem like the healthcare environment is a place that only exists on its own. In the steps there is no mention aspects like how to deal with context of a location or the tectonic of a building. So, the EBD process is not a complete one, as all buildings deal with aspects as mentioned above. Therefore, architects must have their own guidelines about how to deal with those aspects, even if they work with the EBD framework.

### **Positioning**

My aim and approach for my graduation project is to make a building that has meaning by being supportive to the users but also meaning through architectural quality. Besides conducting my own context research and case studies of buildings that have certain qualities that value, I also could use some greater guiding theory. The lecture of Klaske Havik about spatial narratives provided some insight in how this could be done. My take on her lecture was that some aspects about architecture are best explained by experience, real or imaginative. Imagining a certain architectural environment by reading a literary piece might also work the other way. By writing a literary piece about what kind of experience and emotions my design should evoke I could imagine the building in my mind. This is something I could use to give my design extra depth. Another lecture that I found inspiring was the lecture about material culture by Eireen Schreurs. She advocated to put emphasis on certain material, like for example concrete or a specific type of wood, and try to understand the characteristics of a material, so you can do with it whatever you want.

My position regarding architecture is that we should always strive to use evidence concerning people's wellbeing in our designs, especially if it regards people that have little choice, like patients or people that have a little income. However, besides that architecture is also an art form and expressing yourself as a designer should be just as important. Therefore, I question if Health@BK should be a design lab, as aspects as how to deal with context and materiality are barely addressed. A better solution would be if the methodology of Health@BK would become an optional part of other graduation labs at our faculty.

As my conclusion is that EBD is not a complete design process for the design an architectural object. So, working with EBD is only part of your research as an architect. An architect needs to have an opinion or vision about how to deal with all the aspects not provided by evidence.

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