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Systemic evidence-based approach of health-promoting design (SEA)

The integrated working mode of the Designinstitut für Gesunde Gestaltung
on the basis of a biopsychosocial model of health

Helena Müller & Jonas Rehn-Groenendijk

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1. Background

Whether in a city apartment, on the subway, in the office, at a concert, in a family home, at school, doing sport or shopping: In Western societies, people spend a large share of their day indoors (Klepeis et al., 2001). As part of this, they come into contact with different spaces and objects and go through different processes. An interrelation arises between these parts of the environment and people: people build, select, appropriate and design, while the resulting spaces in turn have an effect on people (e.g. through density, brightness, privacy, view) and promote or prevent behaviors. Digital processes and systems often also play a role here. The crucial intersections in this interrelationship are the human senses. They perceive and process particular aspects of the environment. However, this perception is not the same for every person; in addition to biological factors, it also depends on cultural influences and personal experiences (Heinrich, 2021). Situational factors also play an important role, such as stress or an acute illness (Vollmer & Koppen, 2010).

This interrelation between people and the built environment is not without consequences: buildings can influence people's health and well-being - both positively and negatively (Beemer et al., 2021; Devlin, 2014; Shepley & Pasha, 2013; Ulrich et al., 1991, 2008, 2018). Such an influence can be used in a targeted manner by designing environments in such a way that they are as health-promoting as possible.

As early as the sixth century B.C., the Asclepieion hospital was built on the island of Epidaurus in ancient Greece with the assumptions that the built environment, access to daylight and fresh air and numerous other aspects of design measures are directly involved in the recovery process (The Center for Health Design, 2010). This idea has also been taken up in the more modern history of hospital design. As early as the 19th century, the nurse Florence Nightingale (1860, 1863) emphasized the connection between the built environment and health and made specific recommendations for structural implementation. It was not until more than a hundred years later that Ulrich's (1984) influential - albeit often misinterpreted - study on the view from the patient's room followed. This empirical study on the relationship between the built environment and the therapeutic outcome laid the foundation for evidence-based design. This was followed by interdisciplinary theories on therapeutic landscapes (Gesler, 1993), psychosocial-supportive design (Ulrich, 1997), salutogenic design (Dilani, 2005), healing environments (e.g. Dijkstra, 2009) and specific concepts on the role of nature and natural systems („biophilic design“; Kellert et al., 2008; Ryan & Browning, 2020). While these approaches mainly focus on the direct impact of design on health and well-being, others expand this area by investigating how design can influence health behavior (e.g. Fogg, 2003; Lockton et al., 2010; Michie et al., 2014; Rehn, 2018). In addition to issues relating to physical activity (e.g. Center for Active Design, 2010) and the reduction of stress (Knöll et al., 2018; Ulrich et al., 2008), issues of accessibility and inclusion also play a role (Amin, 2018).

In terms of methodology, a combination of scientific or empirical methods and creative-conceptual approaches has become increasingly established in recent decades. Approaches such as a research-driven design approach (Visocky O'Grady & Visocky O'Grady, 2017) illustrate the added value of scientific methods for the design process. Numerous research and analysis methods

can be useful in different project phases (Stickdorn et al. 2018; Kumar, 2008). In this context, the consistent and systematic use of scientific findings for design issues has also been formulated under the paradigm of evidence-based design (Hamilton, 2003; Stichler & Hamilton, 2008).

2. The Systemic Evidence-based Approach (SEA)

The model presented here describes an evidence-based interdisciplinary approach to the evaluation, design and optimization of spaces, products and systems in the context of health promotion. Its application is not limited to explicit areas of therapy and health promotion (e.g. clinics and medical practices). It can also be used in other contexts (e.g. schools, urban spaces, workplace health promotion) to systematically address the influence of the built environment on health and to optimize these contexts in this respect.

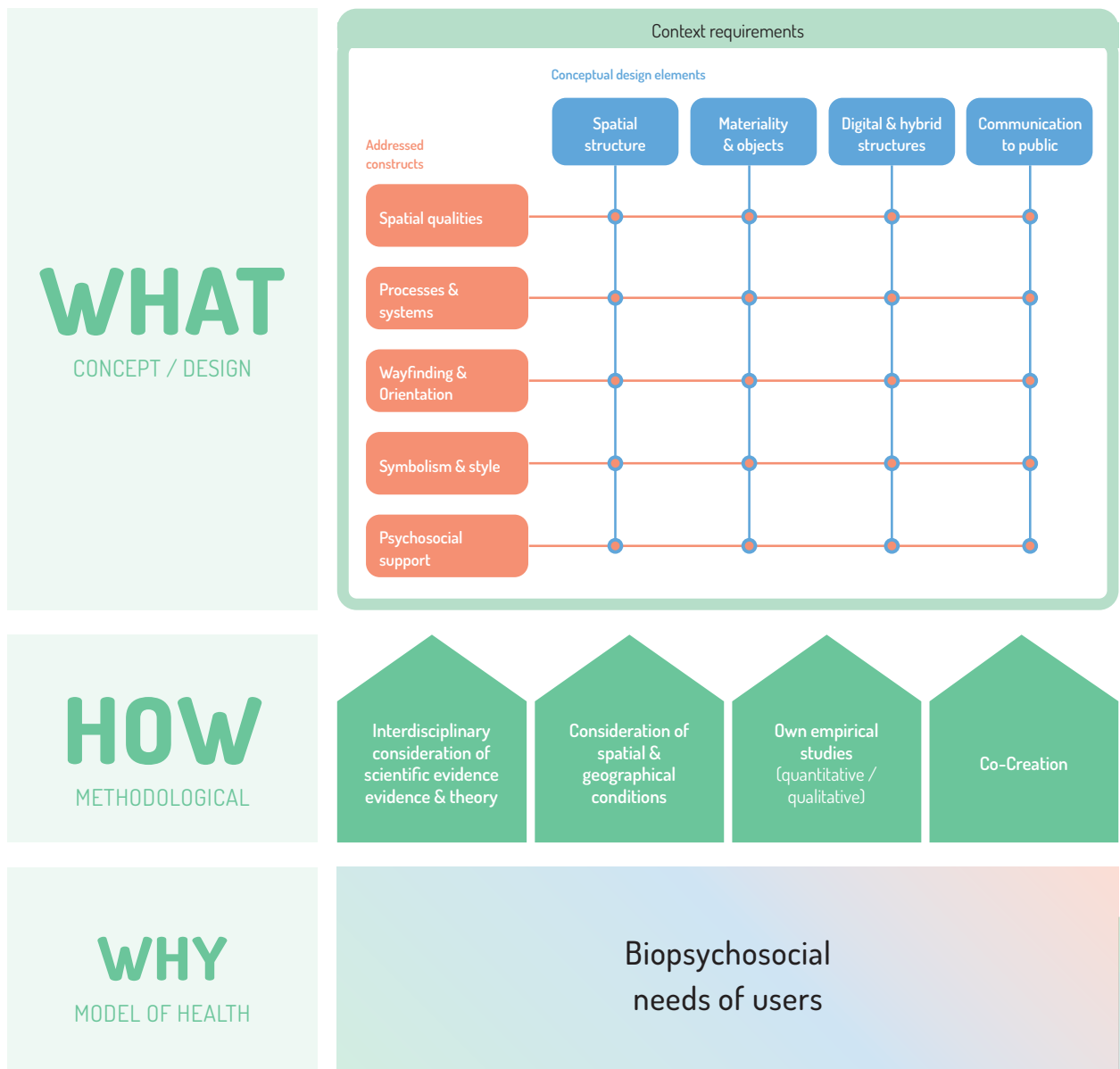


Fig. 1) Model of Systemic Evidence-based Approach (© Designinstitut für Gesunde Gestaltung, 2024)

While numerous models already structure systematic approaches to design processes (see e.g. Dubberly, 2008), the systemic evidence-based approach combines approaches from design and architectural studies with perspectives from (environmental and architectural) psychology as well as social and health sciences to create an interdisciplinary model that can be used as a basis for evaluation and research as well as for actual design and optimization. The model is divided into a methodological-procedural part (the HOW, 2.1) and a design-conceptual part (the WHAT, 2.2). The methodological aspects are of varying importance throughout the entire project. Based on this, the content-oriented matrix serves as a structuring orientation that combines both explorative („How can we combine?“) and evaluative („What is missing? What has been overlooked?“) potentials. This illustrates the interconnection between various design measures (e.g. selection and placement of furniture, use of different light sources, material properties). For example, it is the interplay of these elements that creates a style or supports orientation within a building complex. Following the principles of evidence-based design (Hamilton & Stichler, 2008), the individual project and its framework conditions must be taken into account when applying the model. It serves as a starting point on the basis of which the specific process steps can be adapted.

2.1. The HOW - methodological-procedural approach

a) Interdisciplinary consideration of scientific evidence and theory

In order to design environments that are as health-promoting as possible, first, basic knowledge is required: What mechanisms exist between the person and the environment? A look at the theories of different disciplines and the findings of previous studies can shed light on this. This approach follows the principles of evidence-based design (Hamilton, 2003; Hamilton & Stichler, 2008), in line with evidence-based medicine.

b) Consideration of spatial and geographical conditions

A look at the literature and practical experience sensitizes us to the fact that, as a rule, all creative implementations are shaped by contextual factors that cannot be changed or can only be changed to a limited extent, but which have a significant influence on the effect of the design and the creative scope for action itself. These need to be identified and taken into account in advance and during the course of the project in order to react to obstacles and harness potential. Spatial conditions (in the building stock) are, for example, the size of the rooms, spatial arrangement, building structure. Geographical conditions can include natural environmental factors (e.g. climate, sunlight, seasons, slope, woodland) as well as logistical factors (e.g. public transport connections, walkability of the immediate periphery) and thus also define the systemic framework.

c) Own empirical studies

As there are no scientifically sound, generally valid modes of action and a high degree of context dependency can be assumed, it is advisable not to strive for one-size-fits-all solutions, but to specifically involve those who will use the future environments. In this way, (future) users of the premises have decisive knowledge, wishes and experiences that are incorporated into the design. The key question here

is: What are the needs and requirements of the users? This can be determined using various empirical methods, which can also be combined: quantitative (e.g. questionnaires), qualitative (e.g. interviews, photo voice method) or mixed forms (e.g. systematic observation).

d) Co-Creation

In order to ensure that the environments created are suitable for the users, it is not only possible to identify their needs, but also to make design decisions together with them. Such an approach is currently gaining in importance - not only with regard to particularly vulnerable user groups (e.g. dementia patients; Rehn-Groenendijk et al., 2022). In this way, individual preferences can be increasingly incorporated and identification with the resulting environments can be increased. Under keywords such as „Patient Public Involvement and Engagement (PPIE)“ and „Peer Involvement“, such an approach has already been practiced intensively in some countries for years. For each project, participatory approaches are to be individually tailored to the framework conditions and possibilities of those involved and continuously reflected upon (Hendriks et al., 2015).

2.2. The WHAT - design-conceptual starting points

e) Requirements for the context as an imperative framework for action

The methodological-procedural approach results in user requirements that serve as the basis for the subsequent design process. All design decisions must be based on these requirements. The trick is to develop innovative design solutions based on the identified requirements and thus to create a transfer between the identified data and the creative design work and to develop this iteratively. This also includes specific functional requirements that can be derived from certain disease patterns or symptoms (e.g. higher chair heights for rheumatism patients).

f) Addressed constructs

The rows of the matrix comprise the constructs that are addressed and optimized in the design: Spatial qualities, processes & systems (e.g. action steps across multiple rooms), wayfinding (e.g. orientation using signage), symbolism & style (e.g. conveying values such as transparency) and psychosocial support (e.g. sense of control). As a rule, they can only be influenced in a lasting and targeted manner through the interplay of various design interventions.

g) Conceptual design elements

The columns of the matrix contain the design and conceptual elements that can be used to design the addressed constructs:

Spatial structure refers to the actual building floor plans, room layouts and functional zoning in a given context. *Materiality and objects* encompass all physical elements with which rooms and environments are furnished (e.g. furniture), clad (e.g. wall and floor coverings) or even created (e.g. partition walls and pavilions). This also includes aspects such as technical building equipment as well as decorative lighting. *Digital and hybrid structures* subsumes respective applications in the room (e.g. patient ma-

nagement system). *Communication to public* emphasizes the connection between the spatial-technical context as a setting for healthcare and preventive services and the communicative relationship between service providers and users, which is important for the health-oriented sector. This can include digital formats (e.g. websites) as well as the external presentation in front of the respective building (e.g. practice logo, sign) or the way in which it is addressed in the course of therapeutic measures (e.g. clothing of medical staff).

3. Discussion and positioning

The systemic evidence-based approach presented here is intended to serve as an impulse to systematize design in the context of health promotion more strongly and to base it on scientific methods and findings. Such an approach goes beyond the personal style of designers. The decisive factor is not simply what designers or architects like, but what is (a) scientifically sound and (b) validated from the user's point of view. This results not only in solutions that meet the needs of users, but also those that meet ethical standards. After all, it is important to take into account available knowledge on the effects and health-promoting potential of design interventions and to incorporate the needs of users first-hand in this process.

Intuitive and creative-artistic processes are fundamental resources for a truly health-promoting design. It is simply a matter of systematically incorporating the respective aspects and being able to evaluate them on the basis of clear criteria. In this way, the interdisciplinary field of health-promoting design can develop effectively.

4. References

- Amin, A. (2018). Collective culture and urban public space. *City* 12, 5–24. doi:10.1080/13604810801933495
- Beemer, C. J.; K. A. Stearns-Yoder; S. J. Scholdt et al. (2021): A Brief Review on the Mental Health for Select Elements of the Built Environment. *Indoor and Built Environment* 30 (2): 152–165. doi:10.1177/1420326X19889653.
- Center for Active Design (2010): Active Design Guidelines. Promoting physical activity and health in design. Hg. v. City of New York. New York.
- Devlin, A. S. (2014): Transforming the doctor's office. Principles from evidence-based design. New York: Routledge.
- Dijkstra, K. (2009): Understanding healing environments. Effects of physical environmental stimuli on patients' health and well-being. Enschede: University of Twente.
- Dilani, A. (2005): A new paradigm of design and health in hospital planning. In: *World hospitals and health services : the official journal of the International Hospital Federation* 41 (4), S. 17–21.
- Dubberly, H. (2008): How do you design? A Compendium of Models. San Francisco, CA, USA: Dubberly Design Office.
- Fogg, B. J. (2003): Persuasive technology. Using computers to change what we think and do. Amsterdam, Boston: Morgan Kaufmann Publishers.
- Hamilton, D. K. (2003): The Four Levels Of Evidence-Based Practice. In: *Healthcare Design*, S. 18–26.
- Hendriks, N.; Slegers, K.; Duysburgh, P. (2015): Codesign with people living with cognitive or sensory impairments: a case for method stories and uniqueness. In: *CoDesign* 11 (1), S. 70–82. DOI: 10.1080/15710882.2015.1020316.
- Kellert, S. R.; Heerwagen, J.; Mador, M. (Hg.) (2008): Biophilic design. The theory, science, and practice of bringing buildings to life. Hoboken, N.J.: Wiley.
- Knöll, M.; Neuheuser, K.; Cleff, T.; Rudolph-Cleff, A. (2018): A tool to predict perceived urban stress in open public spaces. In: *Environment and Planning B: Urban Analytics and City Science* 45 (4), S. 797–813. DOI: 10.1177/0265813516686971.
- Kumar, V. (2013): 101 design methods. A structured approach for driving innovation in your organization. Hoboken, N.J.: Wiley.
- Lockton, D.; Harrison, D. J.; Stanton, N. A. (2010): The Design with Intent Method: a design tool for influencing user behaviour. In: *Applied Ergonomics* 41 (3), S. 382–392.

Michie, S.; Atkins, L.; West, R. (2014): The behaviour change wheel. A guide to designing interventions. First edition. London: Silverback Publishing.

Nightingale, F. (1860): Notes on Nursing. What it is, and what it is not. New York: Dover Publications Inc.

Nightingale, F. (1863): Notes on Hospitals. 3. Aufl. London: Longman, Green, Roberts.

Rehn, J. (2018): Design model for health behaviour change. In: Christer Kirsty, Claire Craig und Dan Wolstenholme (Hg.): Proceedings of the 5th European International Conference on Design4Health. Sheffield, UK, 4th - 6th September 2018: Sheffield Hallam University.

Rehn-Groenendijk, J.; Chryssikou, E.; Minetou, L.; Garcia, E. H.; Savvopoulou, E.; Lad, H. (2022): Transdisciplinary Development of a Framework for Co-Creation With People Living With Dementia. In: The European Conference on Aging & Gerontology 2022: Official Conference Proceedings. The European Conference on Aging & Gerontology 2022: The International Academic Forum (IAFOR) (EGen Official Conference Proceedings), S. 1-6.

Ryan, C. O.; Browning, W. D.; Clancy, J. O.; Andrews, S. L.; Kallianpurkar, N. B. (2014): Biophilic Design Patterns. Emerging Nature-Based Parameters for Health and Well-Being in the Built Environment. In: International Journal of Architectural Research 8 (2), S. 62-76.

Shepley, M. M.; Pasha, S. (2013): Design Research And Behavioral Health Facilities. USA: The Center for Health Design.

Stichler, J. F.; Hamilton, D. K. (2008): Evidence-Based Design: What is It? In: HERD: Health Environments Research & Design Journal 1 (2), S. 3-4. DOI: 10.1177/193758670800100201.

Stickdorn, M.; Hormess, M.; Lawrence, A.; Schneider, J. (Hg.) (2018): This is service design doing. Applying service design thinking in the real world ; a practitioners' handbook. First edition. Sebastapol, CA: O'Reilly.

The Center for Health Design (2010): An introduction to evidence-based design. Exploring healthcare and design. 2nd ed. Concord, CA: The Center for Health Design (EDAC study guide series, 1).

Ulrich, R. S. (1997): A theory of supportive design for healthcare facilities. In: Journal of healthcare design : proceedings from the Symposium on Healthcare Design. Symposium on Healthcare Design 9, 3-7; discussion 21-4.

Ulrich, R. S. (1991): Effects of health facility interior design on wellness. theory and scientific research. In: Journal of Health Care Design (3), S. 97-109.

Ulrich, R. S.; Zimring, C.; Zhu, X.; DuBose, J.; Seo, H.-B.; Choi, Y.-S.; Qian, X.; Joseph, A. (2008): A Review of the Research Literature on Evidence-Based Healthcare Design. In: HERD: Health Environments Research & Design Journal 1 (3), S. 61-125. DOI: 10.1177/193758670800100306.

Ulrich, R. S.; Bogren, L.; Gardiner, S. K.; Lundin, S. (2018): Psychiatric Ward Design Can Reduce Aggressive Behavior. Journal of Environmental Psychology 57: 53-66. doi:10.1016/j.jenvp.2018.05.002.

Visocky O'Grady, J.; Visocky O'Grady, K. (2017): A Designer's Research Manual, 2nd edition, Updated and Expanded. Succeed in design by knowing your clients and understanding what they really need. Minneapolis: Rockport Publishers. Online verfügbar unter <https://ebookcentral.proquest.com/lib/gbv/detail.action?docID=4932225>.

About the authors

Dr. Helena Müller holds a doctorate in psychology. Her research is dedicated to the relationship between people and their environments with a particular focus on housing, ageing, mental health and sustainable development. She has professional experience in the field of environmental and architectural psychology in Germany and the Netherlands.

Dr. Jonas Rehn-Groenendijk holds a doctorate in design research and industrial design. His research and teaching focus on the relationship between design, behavior and experience in the context of health promotion and sustainable development. He has teaching experience in Germany, Switzerland and the UK and is a reviewer and assessor. As host of the podcast „Gesunde Gestaltung“ (Healthy Design), he aims to present people and approaches to health-promoting design.

The Designinstitut für Gesunde Gestaltung

The Designinstitut für Gesunde Gestaltung (Design Institute for Healthy Design) researches, designs and communicates in the context of health-promoting design. It was founded by design researcher Dr. Jonas Rehn-Groenendijk and psychologist Dr. Helena Müller with the conviction that the design of spaces, objects and services should be geared towards human health. To this end, it is important to understand user-centered contexts, decipher needs, develop suitable solutions and evaluate them. The Design Institute uses empirical and design methods from various disciplines.

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