

实现设计目标 ——如何打造有益健康的城市绿地

KEEPING PROMISES —HOW TO ATTAIN THE GOAL OF DESIGNING HEALTH- SUPPORTING URBAN GREEN SPACE



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摘要

城市绿地在应对城市化带来的健康挑战中发挥着重要作用。相关研究表明，城市绿地能够改善人们的健康与福祉，辅助自然疗愈方法的实施。在这一过程中，致力于健康设计的景观设计师承担着重要职责。世界卫生组织曾指出，认识到如何进行城市绿地设计才能使其真正发挥积极的健康效益极具意义。为此，他们开发制定了各类工具和设计指南来指导设计。但对于设计师而言，这些工具较难适用于具体的设计实践，相关指南也缺乏通用性。

本文提出了基于循证康复景观设计（EBHDL）的流程模型，以帮助景观产生积极的健康效益。模型由哥本哈根大学自然、健康与设计研究小组开发，已历时15年。在此期间，研究人员、从业人士，以及高校学生不断提供实证数据，使模型日益完善。EBHDL流程模型包含证据收集、编程、设计和评估4个步骤，所有步骤都离不开景观设计师的参与。

哥本哈根大学已将该模型应用于纳卡地亚®疗愈花园和欧拓维亚®健康森林的设计工作中。研究表明，这两个设计实践的成果均较为可观，实现了对EBHDL流程模型的初步验证。同时，该模型具备跨学科性、系统性、透明性和动态性的优势，但也存在耗时长、成本高等不足。

关键词

EBHDL流程模型；循证设计；健康设计；人类健康；景观设计；基于自然的解决方案

ABSTRACT

Urban green space is attributed a significant role in addressing health challenges associated with urbanization. This is supported by evidence confirming that urban green space may both promote health and well-being and support nature-based treatments. Landscape architects who design to improving health outcomes have an important task; but one which also come with responsibilities. This is also noted by the World Health Organization, which states that it is vital to understand how to design green space so that it actually delivers the intended positive health outcomes. In order to deal with this situation, various tools and design guidelines have been developed by them. However, considered from a designer's perspective, these tools are seldom expedient enough to apply in the design process, and the guidelines are often not as generalizable as supposed.

In the current article, the authors present a process model for Evidence-Based Health Design in Landscape Architecture (EBHDL) and suggest that it may be useful as a means to deliver on stated health outcomes. The model has been developed over the last 15 years by the research group Nature, Health & Design at the University of Copenhagen. During this period, the model has been constantly enhanced via input evidence from researchers, practitioners, and university students. The EBHDL process model consists of four steps, all of which the landscape architect may be responsible for: Evidence collection, Programming, Designing, and Evaluation.

The model has been applied in the design of the University of Copenhagen's therapy garden, Nacardia®, and health-promoting forest, Octovia®. Based on encouraging results from research projects, the first step towards a validation of the EBHDL process model have now been made. The benefits of the model include the fact that it is interdisciplinary, systematic, transparent, and dynamic. A weakness of the model is that it is time-consuming, and thereby also costly.

KEYWORDS

EBHDL Process Model; Evidence-Based Design; Health Design; Human Health; Landscape Architecture; Nature-Based Solutions

1 为人类健康和福祉而设计

在应对城市化所带来的气候变化、自然资源短缺和人类健康威胁等挑战时，基于自然的解决方案是屡被提及的话题^{[1][2]}。据估算，到2020年，约75%的欧洲人口将生活在城市中^[1]。世界卫生组织和欧盟均提到，城市绿地这种基于自然的解决方案能够改善城市居民的健康与福祉^{[1][2]}。其中，世界卫生组织认为，“对于地方政府来说，城市绿地是一项重要投资，它能够有效提升市民的福祉。”^[1]欧盟则指出，基于自然的解决方案能够提高可持续城市化水平，“在刺激经济发展的同时改善环境质量，提升城市吸引力和居民健康水平。”^[2]世界卫生组织和欧盟均认为，城市绿地是改善人类健康和福祉的重要抓手，因为已有相关研究数据表明，绿地为保障人类健康提供了重要资源^{[3]-[5]}。如今，也有更多证据表明，绿地可有效改善人类健康状况^{[6]-[8]}，为自然疗愈方法提供环境支撑^{[9]-[11]}。

2 提出问题

当前，包括欧洲在内的世界各地正在积极开展绿地建设，旨在提高人类健康水平，并带来积极的疗愈效果。这离不开景观设计学科中健康设计分支的快速发展。景观设计学科中的健康设计（HDLA）指的是“借助一定的自然环境设计举措来完善疗愈过程，从而提高人类的健康水平”^[12]。同时，通过绿地设计改善人类健康也是设计师的职责，尤其是当场地面向的是病患等弱势群体时。研究和实践均已表明，病患对环境的感知和解读与健康人士完全不同^[13]。换言之，健康人士眼中美丽迷人的世界可能恰好会对病患造成出行上的不便与安全上的威胁。此时，绿地不仅无法改善甚至还会危害病患的健康^[14]。此外，在设计阶段也必须仔细考虑绿地的用途——目前，虽然一些建成绿地不乏精心设计，但使用者却并未按照设计师所预期的方式使用场地。如此一来，绿地改善人们健康与福祉的潜力便会大打折扣甚至完全消失。从HDLA角度来说，设计师应当明确意识到，并非所有的绿地都有益于人类健康^[14]。因此，仅仅通过提高城市绿化水平未必就能改善城市居民

1 Designing for Human Health and Well-being

Nature-based solutions are frequently mentioned in relation to meeting challenges connected to urbanization, e.g., climate change, and loss of natural capital and human health^{[1][2]}. It has been calculated that in 2020 approximately three quarters of the European population will live in urban settings^[1]. The World Health Organization (WHO) and the European Union (EU) state that nature-based solutions like urban green space can improve urban residents' health and well-being^{[1][2]}. The WHO believes: "Urban green space is an important investment that local authorities can make on behalf of citizens and their well-being"^[1]. The EU claims that nature-based solutions can enhance sustainable urbanization by stimulating "economic growth as well as improving the environment, making cities more attractive, and enhancing human well-being"^[2]. Both the WHO and the EU attribute urban green space a grand and important role in relation to improving human health and well-being. The reason for this is linked to research evidence confirming that green space is in fact a resource to human health^{[3]-[5]}. Today, we have evidence showing that green space can promote health^{[6]-[8]} and can act as supportive environments for nature-based treatments^{[9]-[11]}.

2 The Problem

Today, not only in Europe, but in many parts of the world, there is increasing demand for green space that promotes health and supports treatments. This is in turn related to the rapid development of health design in landscape architecture. Health Design in Landscape Architecture (HDLA) can be defined as "the conscious design of natural environments so that they, in a predefined way, support health processes and result in improved health outcomes"^[12]. Designing green space to promote people's health also comes with responsibilities, especially when designing for vulnerable groups, like sick people. Research and practical experience show that sick people may perceive, understand, and interpret the environment totally different from the healthy people^[13]. This means that while a healthy person may experience an environment as beautiful and lovely, a sick person may interpret it as something very negative and threatening, due to their situation. In this case, the green space will not support the health of the sick person; indeed, it may even worsen the person's condition^[14]. In addition, the use the green space is intended for must be carefully considered in the design phase. A disturbing tendency is that some well-designed green space has been constructed, but not used by the target group as intended by the landscape architects. The consequence is that potential of the green space to support health

的健康水平。世界卫生组织欧洲区域办事处也指出了这一点。在《城市绿地与健康：干预措施的影响与效力》报告中，该办事处表示，“要想达到改善人类健康、社会和环境效益的目的，就必须理解如何设计与实施有效的城市绿地干预措施”^[15]。

上述引自世界卫生组织的观点已经在多项研究中予以阐述，这些研究旨在探索面向循证设计的绿地评估工具或指标，以指导改善公众健康^{[16][17]}。相关评估工具和指标关注于居民居住地与毗邻绿地之间的距离以及绿地面积等因素，这可能会对规划工作有所助益。但从设计角度来说，这些工具和指标并未考虑绿地质量或美观等因素，因此可供设计实践参考的价值较为有限。当前的很多研究项目都希望基于设计实践和研究结果制定设计指南，常见的设计指南往往由一系列的建议组成，意在为设计师的设计工作提供清晰的指导和说明。而在HDLA中，这些指南常被用于指导医疗机构的户外空间或针对特定病患群体的疗愈花园的设计。尽管制定指南的初衷是使其可以广泛应用于其他拥有类似环境或病患群体的场所，但受不同气候、建筑类型和现有绿地情况等因素的制约，具体操作困难重重。

景观设计学科正逐步走向循证设计，相关的研究依据也已融入设计审美之中。就HDLA而言，要想实现设计目标，就必须在设计阶段即纳入研究证据。事实上，在很多国家，建筑师只有具备循证设计能力，才能从事诸如医院设计等工作^[14]。在循证设计这一动态、渐进式发展的领域中，尽管对于自然与人类健康的探讨已经长达半个多世纪，但只有极少部分的最新研究关注于景观设计，以致景观设计师的设计工作极度缺乏科学依据。这一弊端在我们的日常工作中尤为明显——景观设计师时常求助于哥本哈根大学，咨询“疗愈花园的面积应该是多少？”“种多少树才能达到优化城市绿地空间、改善居民健康的目的？”

3 如何解决问题

近15年来，哥本哈根大学自然、健康与设计研究小组一直致力于设计、应用并验证一种基于循证康复景观设计（EBHDL）的流程模型。多年以来，EBHDL流程模型经历了多轮演变（图1）。但整体而言，模型的实质内容并未发生明显变化，仅出于提高用户友好度、完善教学方法等目的而在呈现形式上有所更新。模型的优化得益于研究人员、一线景观设计师，以及最重要的——哥本哈根大学学生们源源不断的信息输入。本文将首次展示第三代流程模型的具体内容。

最新一代的EBHDL流程模型涵盖4个步骤：1）证据收集；2）编程；3）设计；4）评估（图1-3）。通常，景观设计师或其他设计师需要全程参与，但如果“设计”过程从属于某个研究项目，则建议由未参与设计的人员完成“评估”步骤，以免存在偏倚。

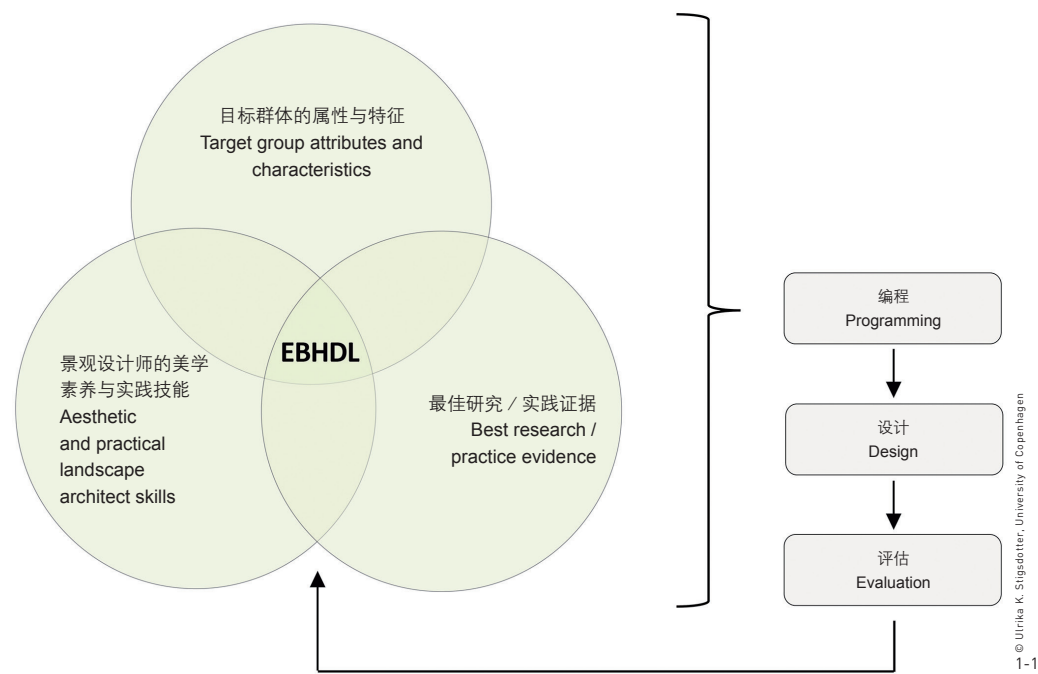
3.1 证据收集

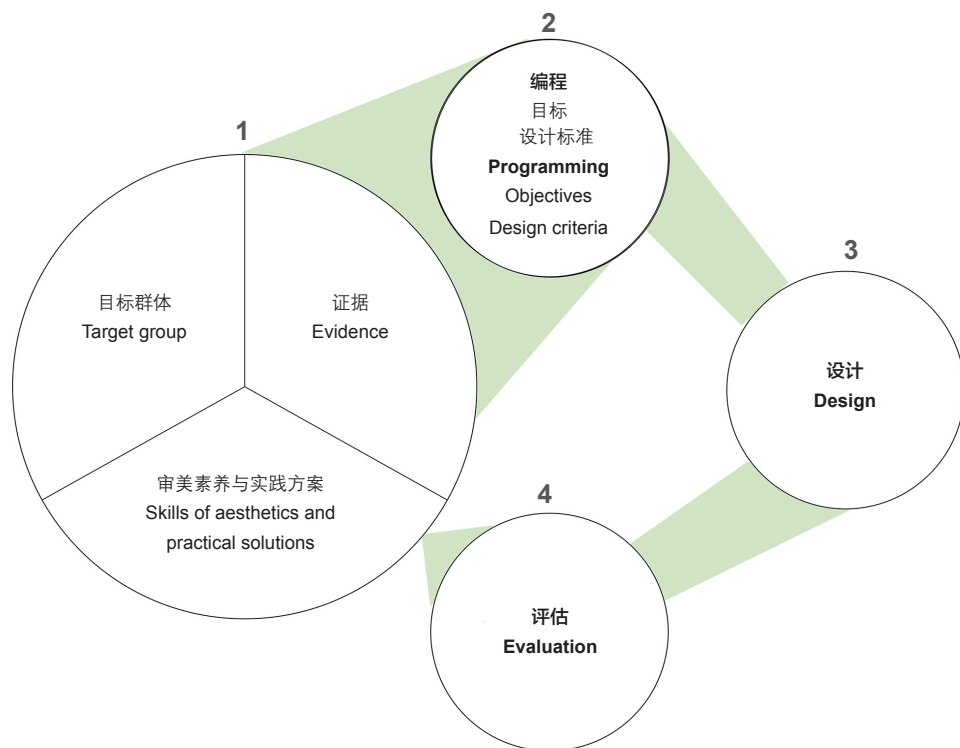
收集与如下4个主题相关的证据（通常这些主题彼此相关，因此它们之间的界限有时较为模糊）：

and well-being is reduced or not realized at all. Regarding HDLA, it is fundamental to understand that not all green spaces can support human health^[14]. So, just making the cities greener does not necessarily mean that they will promote health. The WHO's regional office for Europe has also noted this. In their report Urban Green Space and Health: Intervention Impacts and Effectiveness, it is stated that “understanding how to design and deliver effective urban green space interventions is critical to ensuring that urban green space delivers on its reported positive health, social and environmental outcomes”^[15].

The above statement from the WHO has been addressed in several research projects where the goals have been to develop evidence-based green space assessment tools or indicators for public health^{[16][17]}. These tools and indicators might be relevant from a planning perspective, since they commonly focus on factors such as the distance from the citizens' homes to nearest green space and the size of the green space. However, from a design perspective they are less useful since they do not take into account, for example, the quality or the aesthetics of green space, and they are therefore often difficult to be included in the actual design process. A large number of projects have aimed to formulate design guidelines based on practical experience or research results. Design guidelines are most often lists of recommendations intended to provide clear instructions to designers. In relation to HDLA, these guidelines are often related to outdoor spaces at health care facilities or therapy gardens designed for one specific patient group. Even though these guidelines are intended to be applicable to similar environments and patient groups elsewhere, it often proves difficult in practice to apply them to another context

1. 2006-2020年期间开发的EBHDL过程模型的两个版本。图1-3为2020年开发的第三版模型的工作流程图示。
1. The three versions of the EBHDL process model, developed between 2006 and 2020. Figure 1-3 is the schematic presentation of the third version developed in 2020.





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1-2

(e.g., different climate, types of buildings, and existing green space conditions).

Landscape architecture is gradually becoming a more evidence-based profession, where research evidence is integrated into the aesthetics of the design. In HDLA, where it is crucial we deliver what we promise, it seems obvious to include research evidence in the design phase. Indeed, it is worth mentioning that in many countries the architect has to be qualified in evidence-based design in order to be allowed to design, for example, a hospital^[14]. In this dynamic and progressive field nature and human health has a history going back more than half a century. Unfortunately, only a fraction of the current research into this field focuses on landscape architecture. The unfortunate consequence of this is that there are very few research results available that can be incorporated into the design work of landscape architects. This lack of relevant and applicable evidence is clearly apparent when practicing landscape architects repeatedly contact the University of Copenhagen with questions like: “How many square meters should a therapy garden be?” and “How many trees are needed to optimize an urban green space’s potential for promoting health?”

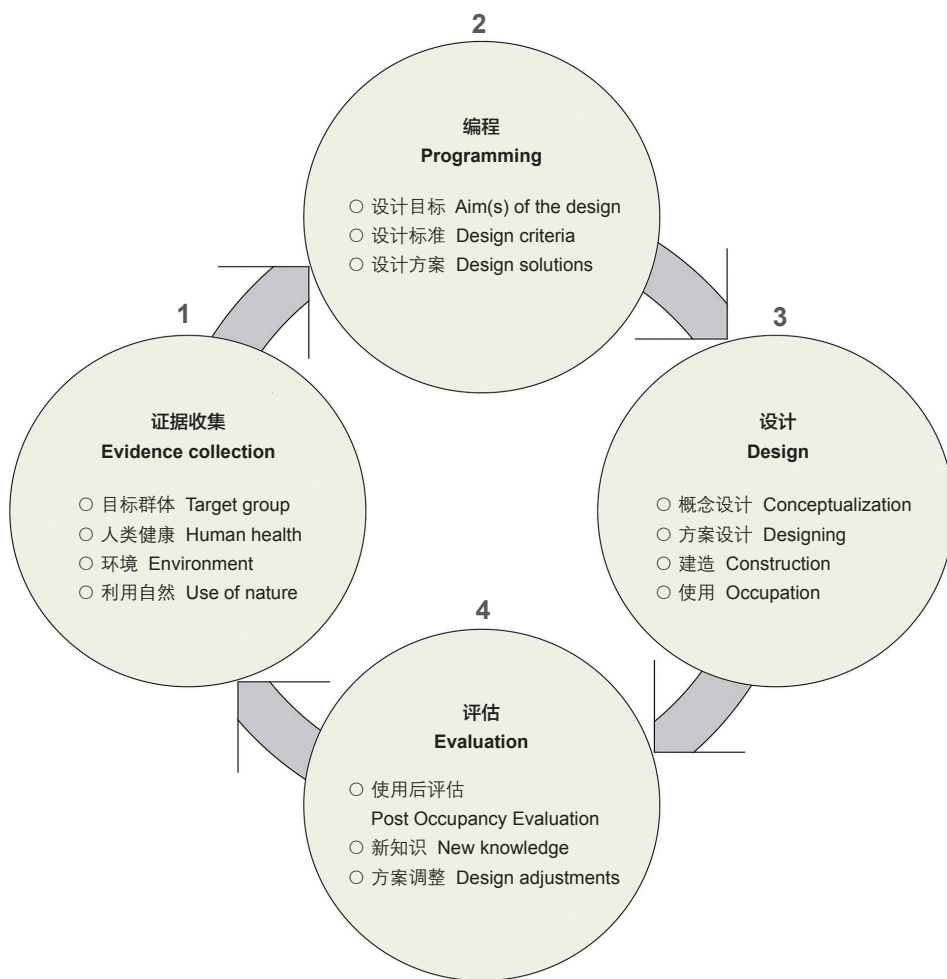
3 How to Solve the Problem

For almost 15 years, the research group Nature, Health & Design at the University of Copenhagen has been dedicated to developing, applying, and validating a model for the working process of evidence-based health design in landscape architecture (EBHDL). Over the years, the process model has evolved (Fig. 1). Overall, the content of the EBHDL process model is the same, but in order to make it more user-friendly and pedagogical, the presentation of the model has changed. This progression is based on input from researchers, practicing landscape architects and, not least, students at the University of Copenhagen. In this article, the third generation of the process model will be presented for the first time.

The latest version of the EBHDL process model consists of four steps: 1) Evidence collection; 2) Programming; 3) Design; and 4) Evaluation (Fig. 1-3). The landscape architect or designer may be responsible for all the steps; however, if the design is part of a research project, step four should preferably be carried out by someone else in order to avoid bias.

3.1 Evidence Collection

The process starts with collecting evidence related to four main topics. It should be mentioned that the borders between them are not always sharp—since the topics are often interrelated. The four topics are presented below:



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1) 目标群体, 即设计对象。在证据收集过程中, 性别、年龄和社会经济状况等个人信息非常重要。同时, 还要采集目标群体的健康状况、健康问题, 身体可能存在的优势与劣势等。数据来源可以是“白色”文献(采用同行评议制度的科技期刊发布的文章)和“灰色”文献(包括报告、会议论文集和工作文件), 也可以是针对专家、目标人群或目标人群亲属进行的采访。

2) 人类健康, 即目标群体能够与自然的接触中获得哪些益处。该主题主要关注自然、人类与健康之间可能存在的正相关关系。数据来源为“白色”文献和“灰色”文献, 以及环境心理学、景观设计学和心理学的理论研究。

3) 环境, 即场地现状如何及何种设计方案能够促进健康。该主题强调的是景观设计师的设计实践能力、审美素养与知识水平。景观分析、最佳案例、使用者数据、专家意见、“白色”与“灰色”文献, 以及法律法规均能提供相关的证据支持。

4) 利用自然, 即如何借助环境改善目标群体的健康状况。该主题的核心是通过收集相关证据, 了解目标群体如何将自然用作一种治疗方法来改善健康水平或预防疾病。可从自然疗愈项目、有益健康的干预措施及其他相关活动获取有效信息, 或从“白色”与“灰色”文献和最佳实践案例中采集证据。

3.2 编程

完成证据采集后, 需要对这些证据进行系统化处理(图2)。处理步骤包含三个部分:

1) 设计目标: 为了对证据进行系统化处理, 必须明确设计目标,

程序指令 Program		
设计目标: Aim(s) of the design:		
目标群体 Target group		
证据 Evidence	设计标准 Design criteria	设计方案 Design solution
人类健康 Human health		
证据 Evidence	设计标准 Design criteria	设计方案 Design solution
环境 Environment		
证据 Evidence	设计标准 Design criteria	设计方案 Design solution
利用自然 Use of nature		
证据 Evidence	设计标准 Design criteria	设计方案 Design solution

1) Target group, meaning who the design is intended for. It is often useful to collect evidence regarding bio-data such as gender, age, and socioeconomic status. However, it is also important to collect evidence regarding the target group's health status, health-related challenges, possible limitations, or strengths. The evidence can, for example, be found in “white” (articles published in peer-reviewed scientific journals) and “grey” (e.g. reports, conference proceedings, and working papers) literature, and / or be derived from interviews with experts, the target group or relatives of the target group.

2) Human health, meaning how the target group can benefit from nature exposure. The focus here is on possible positive correlations between nature, humans, and health. Evidence can be found in “white” and “grey” literature, and in theoretical works from, for example, environmental psychology, landscape architecture, and psychology.

3) Environment, meaning what the existing conditions at the setting are and how the design can support the intervention in promoting health. The focus here is on the landscape architect's practical and aesthetic skills and knowledge. Evidence can be derived from landscape analyses, best cases, and user and expert involvement. “White” and “grey” literature, rules and regulations, and legislation can also provide important evidence.

4) Use of nature, meaning how the setting can be used to support the target group's health. The focus here is on gathering evidence on how this target group can use nature as a form of treatment, for health promotion or to prevent sickness. In addition, it can also be beneficial to collect evidence regarding nature-based treatment programs or health-promoting interventions, and related activities. Evidence can be found in “white” and “grey” literature and in best practices.

3.2 Programming

When all the evidence has been collected, it needs to be systemized (Fig. 2). This step consists of three parts:

1) Aim(s) of the design: in order to systemize the evidence, it is necessary to formalize a clear aim with the design, i.e. what health outcomes do you want to influence through the design? It is important that a decision is made at this stage about which eventual therapeutic approach (the sort of treatment program, health promoting interventions, etc.) is to be adopted. The evidence should be sorted, evaluated, and interpreted in relation to quality and relevance, and systematized in the form of a table. Then the evidence is organized into design criteria.

2) Design criteria are explicit goals, based on the selected evidence, that must be achieved through the design in order to be considered successful. For example, “Easy to interpret” means

2. 程序组织过程示例
2. An example of how the program can be organized

即希望通过设计达到什么样的健康效果。在这一阶段，需要确定最终会采取哪种疗愈手段（如疗愈项目类型、有益健康的干预措施等）。应根据各个证据的质量和相关性对其进行分类、评估和解读，并以表格形式予以系统化呈现。最终依据上述证据制定相应的设计标准。

2) 设计标准是基于选定证据的明确目标，唯有达到标准要求的设计才是成功的设计。例如，“易于理解”这一设计标准要求设计必须能够帮助患者理解疗愈花园的好处，以及他们能在花园中进行的活 动类型（正如前文所述，病患对环境的认识与解读可能有别于健康人士）。

3) 设计方案描述了特定的设计策略是如何满足相应设计标准的。以与前述设计标准有关的疗愈花园为例：入口设计形似一个亲切的拥抱，布满攀爬植物的绿廊藤架指引着患者来到花园中。行至藤架尽头，“复得返自然”的惬意扑面而来——高大的树冠覆盖了前行的斜坡，引导着患者穿越至前方的阳光草坪。待漫步至婆婆树影的尽头，泉水声潺潺入耳，患者便来到了花园的中心，疗愈由此开始。

3.3 设计

在完成编程后，景观设计师便正式启动设计工作，该步骤主要包括4个部分：

1) 概念设计：即通过概念图或概况描述来示意设计标准中所确定的功能、结构和形式。例如，在概念图中标示出适合的社交活动区及私密空间的位置。

2) 方案设计：完成概念设计工作后便正式进入了方案设计阶段。需要强调的是，设计需在遵循循证标准的同时与美学表达相协调。

3) 建造：作为对设计方案的具体实施，建造过程应当严格遵循设计方案。以促进健康为导向的设计往往会被寄予厚望，期望其能迅速发挥作用。因此，一切工作都要准备充分，例如必须保证具备充足的植被规模。

4) 使用：在建造完成后，目标人群便会依据治疗方法来使用场地，开展有益健康的活动或施行自然疗愈方案。其中需特别强调的是，必须确保目标人群能够畅通无阻地使用场地。

3.4 评估

当目标群体开始使用场地后，评估工作也相应启动。这是流程的最后一步，主要包括三个部分。

(1) 使用后评估

使用后评估（POE）可分为多种类型。本流程模型使用的POE主要

that patients must be able to understand what a therapy garden can offer them, and what they are allowed to do (referring to the evidence stating that sick people may understand and interpret the surroundings differently to a healthy individual).

3) Design solutions is the description of how the design criteria (one by one) will be solved through the specific design developed. One example from a therapy garden (relating to the design criteria mentioned above) is as follows: The entrance is shaped like a welcoming embrace. A pergola with climbers guides patients into the garden. Where the pergola ends, nature takes over. High tree canopies meet over the patients' heads, encouraging the patients to walk down the sloping terrain towards the light in the meadow ahead. Where the shelter from the tree canopies ends, the sound of a bubbling spring takes over and leads the patients to the garden's heart where the therapy begins.

3.3 Design

When the programming is finished, it will guide the landscape architect's design process. This step includes four parts:

1) Conceptualizing: it refers to schematic drawings or descriptions (broad outlines) of the function, structure, and form of the design criteria. For example, schematic markings on a drawing can indicate where an area for social activities can be placed in the setting, and where the more private rooms should be located.

2) Design: after the conceptualizing phase comes the design phase. It is important to stress that the evidence presented in the design criteria must be balanced with the aesthetics.

3) Construction: it is important to make sure that the setting is constructed in accordance with the design, since the construction is the materialization of the design. Often a design that promotes health is expected to work from day one. Therefore, it is important to make sure that, for example, the plants are of an adequate size.

4) Occupation: after construction, the setting will be used by the target group in accordance with the therapeutic approach taken, which can include e.g. a health promoting activity guide or a nature-based treatment program. It is vital to make sure that there are no obstacles for the target group to use the setting as planned.

3.4 Evaluation

This is the final step, and the evaluation starts after the target group has started using the setting. This step includes three parts.

(1) Post Occupancy Evaluation

There are various types of Post Occupancy Evaluations (POE).

考察设计是否达到了最初的目标（即“编程”步骤中所列的目标），包括5个核心评估对象：1）环境，主要为物理环境；2）环境体验，聚焦于设计对目标群体可能产生的任何影响；3）运营，主要指场地的使用方式和场地上进行的活动；4）运营体验，主要涉及场地中基于自然的使用方式和活动对目标群体的影响；5）健康与福祉改善成效，主要为场地环境如何促成预期用途和活动^[18]。

（2）新知识

POE的结果和经验可作为新知识和证据，进而应用于其他项目。

（3）方案调整

在POE过程中形成的知识可为决策提供依据，帮助调整设计方案。

此时，整个进程也就重新循环至EBHDL流程模型的第一步“证据收集”。

4 EBHDL流程模型在自然、健康与设计实验室中的应用

在哥本哈根北部30km处的一家古老而美丽的植物园中，有一间完全位于户外的实验室——“自然、健康与设计实验室”。该实验室由自然、健康与设计研究小组创建和经营，包括了三个室外空间，分别是：建于2011年的纳卡地亚®疗愈花园（图3），可为遭受与压力相关

The POE used in the current process model examines whether the design meets the original aim(s) (set in the step of Programming). There are five core evaluation points: 1) Environment, focusing on the physical conditions; 2) Experience of the environment, focusing on any possible impact of the design on the target group; 3) Operations, focusing on the use and activities in the setting; 4) Experience of operations, focusing on the impact of the nature-based use and activities on the target group; and 5) Health and well-being outcomes, focusing on how the setting facilitates a supportive environment for the intended use and activities^[18].

（2）New knowledge

The results and experiences from the POE can be applied as new knowledge and evidence in other projects.

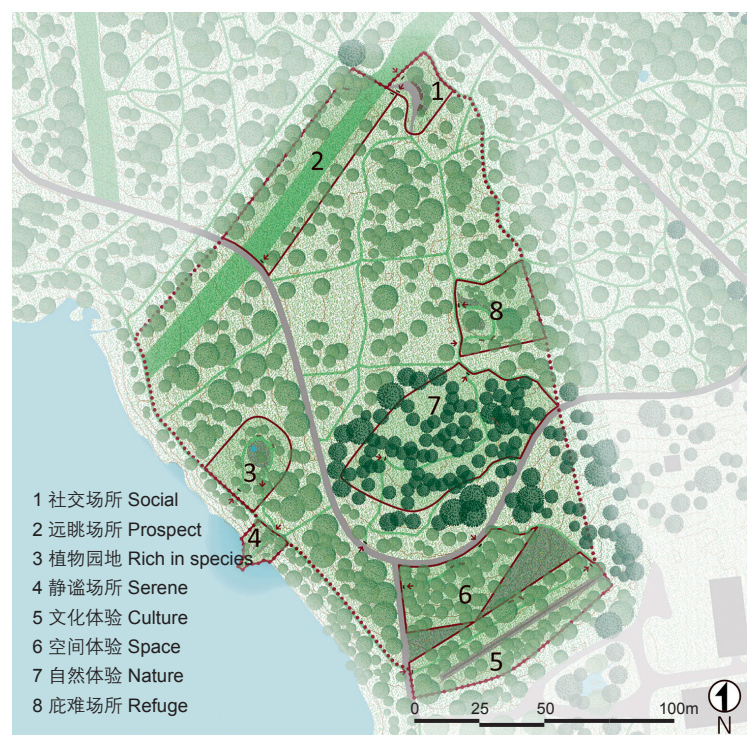
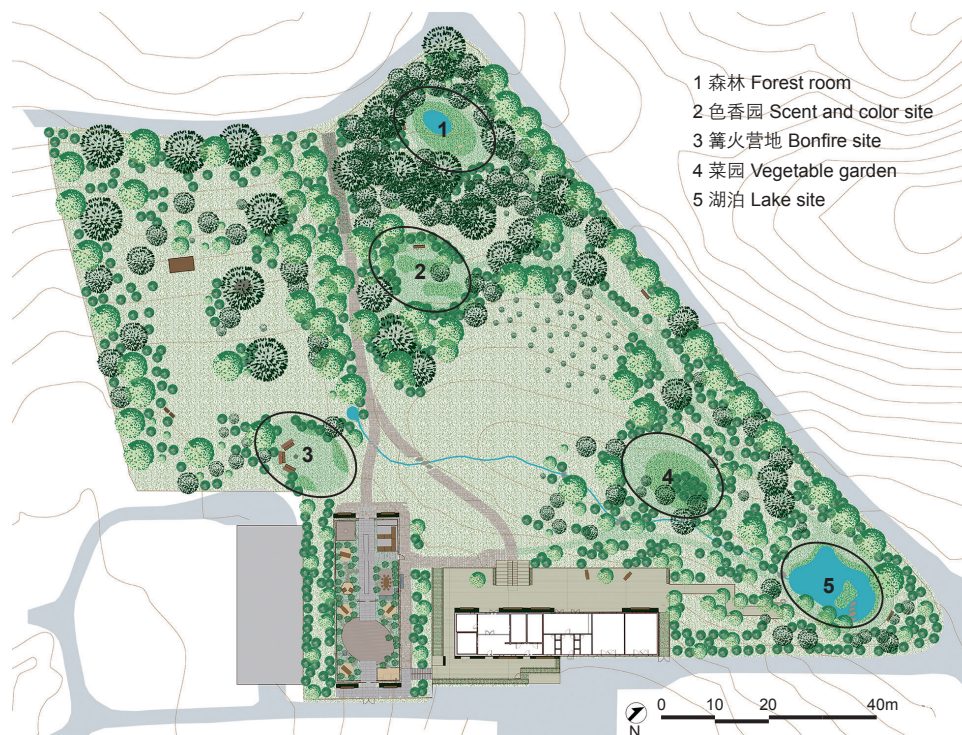
（3）Design adjustments

The knowledge generated from the POE can also be used as a basis for making decisions on adjusting the design. At this point, the process goes back to the step of “Evidence Collection” in the EBHDL process model.

4 Application of the EBHDL Process Model in the Nature, Health & Design Laboratory

The Nature, Health & Design research group runs a full-scale outdoor laboratory located in an old and beautiful arboretum in

3. 纳卡地亚®疗愈花园总平面图
4. 欧拓维亚®健康森林总平面图
3. Masterplan of the Nacardia® therapy garden
4. Masterplan of the Octovia® health forest



① 此处的“需求”包括场地中需有其他人在场、使用者需身处花园中的可视范围内，以及使用者“需要”浇灌花园中的植物或铲除杂草等。

① The demands here, for instance, could be the presence of other people, being visually exposed in the garden, or that the garden puts demands on the clients—they “need to” water the plants or pick the weeds.

5. 纳卡地亚®疗愈花园入口
6. 纳卡地亚®疗愈花园中设有小湖，通过汀步可到达一座湖中小岛。
5. The entrance to the Nacardia® therapy garden
6. The lake in Nacardia® therapy garden, with stepping stones leading to a small island



的疾病困扰的患者提供基于自然的疗愈方案；建于2014年的欧拓维亚®健康森林（图4），可为游客提供有益健康的自然体验；在建的森林步道——“行走的绿色空间”，可为存在行动障碍的患者提供心理康复、社交活动和体育锻炼的空间。这三处室外空间均依据EBHDL流程模型进行设计，且可用于科研、教学和展示。

乌尔莉卡·K·斯蒂多特教授通过查阅大量的“白色”和“灰色”文献、结合自身作为一线景观设计师的经验，再辅以对场地的景观分析，收集了众多与纳卡地亚®疗愈花园有关的研究证据（图5，6）。同时，她也悉心向致力于景观设计、建筑设计和环境心理学的专家学者，以及医生、心理学家和专业从事自然疗愈的理疗师等临床医师求教。在证据收集过程中，斯蒂多特与教育心理学家苏斯·索拉·克拉松博士通力协作，为纳卡地亚®疗愈花园开发了具体的自然疗愈项目。以上收集的所有证据均被置入一个综合性“程序”中进行系统化处理。在建造完成并投入使用后，景观设计师乌尔里克·西德尼斯博士对花园进行了深入的使用后评估调查^[18]。

图7以纳卡地亚®疗愈花园的设计为例，展示了一项特定的证据在EBHDL模型中的4个处理步骤。首先，该证据是一项景观设计理论，它指出使用者的情绪控制和认知能力将决定他们对自然的感知程度和达到满足的自我需求^①水平。该证据可呈现为一个4层三角结构——人们越能有效地控制自己的情绪及拥有越强的认知能力，对于自然环境的需求就越少，而对于自我能力的需求越大。其次，将上述证据置入“程序”中进行系统化处理——输入标题“利用自然”及具体证据的描述“使用者对自然的感知和他们所能够自我需求取决于他们

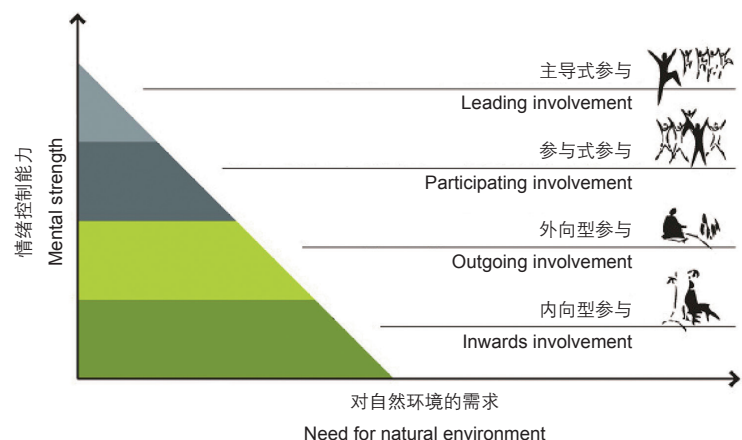
Denmark, 30 kilometers north of Copenhagen. The laboratory called the Nature, Health & Design Lab. consists of three outdoor settings: the Nacardia® therapy garden established in 2011 (Fig. 3), where nature-based therapy is offered to individuals suffering from stress-related illnesses; the Octovia® health forest established in 2014 (Fig. 4), where visitors are offered health-promoting nature experiences; and the Move Green forest trail (under construction), where individuals with mobility disabilities will be offered mental restoration, social activities, and physical exercise. All three settings are used for research, teaching, and demonstrations, and have been designed in accordance with the EBHDL process model.

Professor Ulrika K. Stigsdotter gathered evidence for the Nacardia® therapy garden (Fig. 5, 6) from a number of sources including “white” and “grey” literature, her own experiences as a practicing landscape architect, and landscape analyses of the site. She also drew on the knowledge of two groups of experts: 1) Researchers in landscape architecture, architecture, and environmental psychology, and 2) Medical clinicians, including doctors, psychologists, and therapists with expertise in nature-based treatment. During the evidence gathering phase, Stigsdotter worked closely with educational psychologist and PhD Sus Sola Corazon, who developed the nature-based treatment program for the Nacardia® therapy garden. All the evidence was systemized in a comprehensive Program. After the construction and occupation phases, landscape architect and PhD Ulrik Sidenius made a thorough POE of the garden^[18].

Figure 7 illustrates how one selected piece of evidence was processed using the 4 steps in the EBHDL model as part of the design for the Nacardia® therapy garden. Step 1: The selected evidence—a theory of landscape architecture—states that clients’ experience of nature and the level of demands^① they are able to cope with depend on their emotional and cognitive resources.

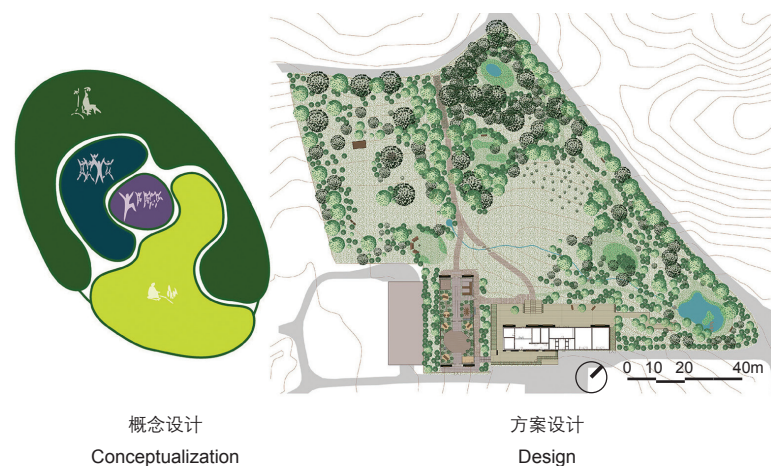
步骤1: 证据收集

Step 1: Evidence collection



步骤3: 设计

Step 3: Design



的情绪控制和认知能力”。经过计算后，将依据该证据生成相应的设计标准，即“设计方案应当提供一个包含所有4层需求水平的三角结构”，而后形成三项具体设计方案：“1）明确不同需求层级的界限，避免出现高需求区域与低需求区域相重叠的情况”，“2）环绕场地外围设置低需求区域，以方便使用者到达花园的任意区域”，以及“3）若有必要，保证使用者可较快回到低需求区域”。随后，进行概念设计，展示满足不同需求的区域将如何分布于花园中——低需求区域位于花园的边缘处，高需求区域设于中心位置。场地概念图也揭示了最终设计方案的轮廓。最后，基于使用后评估、系统化的行为观察和使用者访谈的结果，生成简化的图解。

相较而言，由斯蒂多特、西德尼斯和安妮·达尔·拉夫沙吉共同设计的欧拓维亚®健康森林（图8，9）有着截然不同的设计过程。该设

步骤2: 编程

Step 2: Programming

利用自然 Use of nature		
证据 Evidence	设计标准 Design criterion	设计方案 Design solution
使用者的情绪控制和认知能力将决定他们对自然的感知程度和达到满足的自我需求水平 The clients' experience of nature and the level of demands they are able to handle depend on their emotional and cognitive resources	设计方案应当提供一个包含所有4层需求水平的三角结构 The design should offer all 4 levels of the mental strength triangle	明确不同需求层级的界限，避免出现高需求区域与低需求区域重叠的情况 Place the levels so there are no conflicts between the high demanding and low demanding areas 环绕场地外围，设置低需求区域，以方便到达花园的任意区域 Low demanding areas embracing the setting in order to make it easy to access all the areas of the garden 若有必要，可迅速调整为低需求区域 Should be easy to quickly withdraw to lower demanding areas if needed

步骤4: 评估

Step 4: Evaluation



This is illustrated as a four-tier triangle where the need for natural environments that place few demands on the client is large at the bottom and smaller at the top. Step 2: The evidence is systemized in the Program, under the heading “Use of nature”: “The clients’ experience of nature and the level of demands they are able to handle depend on their emotional and cognitive resources.” Then the evidence is formulated as a design criterion: “The design should offer all 4 levels of the mental strength triangle.” This is followed by three design solutions: “1) Place the levels so there are no conflicts between the high demanding and low demanding areas”; “2) Low demanding areas embracing the setting in order to make it easy to access all areas of the garden”; and “3) Should be easy to quickly withdraw to lower demanding areas if needed.” Step 3: A conceptual sketch,

7. 以纳卡地亚®疗愈花园为例，展示了EBHDL模型对所选取证据进行处理的4个步骤。

7. Example of the EBHDL process in the Nacardia® therapy garden. The figure illustrates how a selected piece of evidence is processed through the 4 steps in the EBHDL model.

8. 欧拓维亚®健康森林中的第一个“场所”，这里代表着名为“社交”的感官感知维度。
9. 欧拓维亚®健康森林中的第七个“场所”，这里代表着名为“自然”的感官感知维度。
8. The first room in Octovia® health forest, representing the PSD called Social.
9. The seventh room in Octovia® health forest, representing the PSD called Nature.



设计项目首先进行了十分详细的前期研究，结果表明，自然界所存在的某些特性——即感官感知维度——可能对心理健康有促进作用。感官感知维度主要通过针对8种自然体验维度的要素分析而获得，它们的变量数目各不相同^[19]。要素分析和景观分析的结果是“编程”的重要证据来源。随后的设计也包含了8种不同的“场所”空间环境。经过不断的优化，每个“场所”都聚焦于某一种特定的感官感知维度，并由一条长达750m的小径串联为一体。

森林步道“行走的绿色空间”是一个在建项目，斯蒂多特和西德尼斯当前的任务是确保设计方案将所有的设计标准都纳入了考量。该项目的证据来源十分广泛，包括系统性文献综述、针对行动不便人士使用绿色空间情况的全国性调查的统计分析、对从事帮助行动不便人士进行户外康复的专业人员的访谈、室内焦点小组访谈、在户外自然环境中进行的面向行动不便人士的个人深度访谈、对较为成功的无障碍绿色空间案例的实地研究，以及一些工作坊成果。森林步道预计于2021年秋季向公众开放，场地使用后评价也将于2022年春季开展。

研究结果表明，纳卡地亚®疗愈花园和欧拓维亚®健康森林已经实现预期效果^{[10][18][20]-[23]}。例如，纳卡地亚®疗愈花园为使用者带来了安全感十足的环境体验，这里所提供的别具意义的空间和活动对身心健康大有裨益，使用者也自述其健康水平有了显著提升^[18]。研究者也针对欧拓维亚®健康森林进行了多项心理指标监测，其中一项结果表明，在健康森林中漫步能够有效调节使用者的情绪。此外，使用者也认为健康

illustrating how the different layers of the triangle should be placed in the garden. Low demanding areas around the edges of the garden, and the high demanding ones in the center of the garden. The site illustration shows how it was included in the final design. Step 4: The illustration is a simplification, based on the results from the POE, systematic observations of behavior, and interviews with the clients.

Together with Anne Dahl Refshauge, Stigsdotter and Sidenius designed the Octovia® health forest (Fig. 8, 9), but the design process differed to that used for the Nacadia® therapy garden. The design is based on specific research whose conclusions indicated that certain qualities in nature, so called Perceived Sensory Dimensions (PSDs), may have a positive impact on mental health. The PSDs are the result of interpreting a factor analysis that identified eight dimensions of nature experiences, with differing numbers of variables^[19]. The factor analysis and landscape analyses constitute the main sources of evidence in the Program. The design consisted of eight different spatial settings, referred to as “rooms.” Each room has been redesigned to accentuate one particular PSD, and a 750-meter trail connects the eight rooms.

The Move Green forest trail is an ongoing project. Stigsdotter and Sidenius are currently in the phase where they are making sure that all design criteria have been taken into account in the design. The evidence collected for the project has come from a wide range of sources, including a systematic literature review, statistical analyses of a nationwide survey on the use of green space by people with mobility disabilities, interviews with professionals that work out in nature with individuals with mobility disabilities, focus group interviews (indoors), individual in-depth interviews (out in nature) with individuals with mobility disabilities, field studies looking at successful examples of accessible green spaces, and several workshops. The forest trail is due to open in autumn 2021, and the POE is scheduled for spring 2022.

Research evidence has shown that both the Nacadia® therapy garden and the Octovia® health forest deliver what was promised^{[10][18][20]-[23]}. For example, clients experienced the Nacadia® therapy garden as a protective and safe environment. They found meaningful spaces and activities which suited their current physical and mental resources, and their self-estimated general health had increased significantly^[18]. One of the results from measuring a number of psychological indicators conducted in the Octovia® health forest indicates that a walk through the health forest has a positive effect on mood. The health forest is also rated as having a high perceived level of restorativeness. The results indicate that both the Nacadia® therapy garden and the Octovia® health forest can be seen as two prime examples of

森林能够有效帮助其恢复健康。研究结果还显示，纳卡地亚®疗愈花园和欧拓维亚®健康森林是两个颇具代表性的基于自然的解决方案，可帮助使用者积极应对如今快速城市化进程所带来的心理健康问题。未来，EBHDL流程模型还需进行更多验证研究，以上结果则为此打下了较好的基础。

5 EBHDL流程模型的优势与不足

EBHDL流程模型的最大优势在于，整个设计流程始终以使用者为中心。景观设计师必须认识到这一点，并且愿意面对现有设计中的不足，才能积极地完善设计方案。在过去12年中，哥本哈根大学已经面向健康设计专业的国际硕士生开设了相关课程，讲授EBHDL流程模型，来自非洲、亚洲、欧洲、北美洲、大洋洲和南美洲等地区的学生均参与了这门课程。课程评估结果显示，大部分学生认为，EBHDL流程模型不仅能为他们的设计过程提供指导和帮助，也能为设计方案提供有效的理论支撑——因为在过去，很多学生往往不清楚应该如何处理他们收集而来的各类证据，例如如何在设计过程中运用已有的设计指南、研究结果和研究理论；而具备清晰结构的EBHDL流程模型则有效解决了此类难题。

将EBHDL流程模型应用于纳卡地亚®疗愈花园和欧拓维亚®健康森林后，该模型的部分优势逐渐显现：

1) 跨学科性：EBHDL流程模型综合运用不同学科的研究和实践成果，收集不同来源的证据，如设计指南、最佳实践案例、景观分析、工作坊和研究成果等。

2) 系统性：模型的一大特征是结合具体目标将收集到的证据进行系统化处理。

3) 透明性：整个流程记录了所有设计决策的论证过程。

4) 动态性：评估结果能够指导决策，从而对未来的设计方案进行调整，确保调整结果符合最初的目标。此外，整个过程中形成的新知识还可用于指导其他项目。

当然，EBHDL流程模型也存在不足之处，主要在于时间和资金成本较高，其中实施评估的成本尤高，可能还会阻碍某些项目的顺利进行。此外，对于一线景观设计师而言，相关性更高、实用性更强的证据仍有待补充。

nature-based solutions that contribute to meeting the mental health challenges linked to today's rapid urbanization. Further, the results can be seen as the first step in the process of validating the EBHDL process model. However, more research is, of course, needed.

5 Strengths and Weaknesses with Applying the EBHDL Process Model

The biggest strength with the EBHDL process model is that the users are central to the design process. It is vital that the landscape architect accepts this and is willing to handle possible design failures in order eventually to come up with an improved design. For the last 12 years, the process model has been taught to master students on an international master's course in Health Design at the University of Copenhagen. Over the years, students from all over the world (Africa, Asia, Europe, North America, Oceania, and South America) have participated in the course. The general impression, based on course evaluations, is that the EBHDL process model guides and helps the students in the design process. It also provides the students with strong arguments for their designs. In our experience, students are often baffled as to how to deal with various kinds of evidence. It is difficult for them to understand how to use, for example, design guidelines, research results, and theories in their designs. The clear structure of the EBHDL process model is reported as being very helpful in supporting them in this.

Some of the benefits with the EBHDL process model that have been identified through using it in the design of the Nacadia® therapy garden and the Octovia® health forest are:

1) Interdisciplinary: the EBHDL process model incorporates evidence from different research and practice disciplines. It also includes evidence from various types of sources, e.g., design guidelines, best practices, landscape analyses, workshops, and research results.

2) Systematic: an important part of the model is that collected and generated evidence is systematized in relation to clear aims.

3) Transparent: the whole process provides documentation of the arguments governing the decisions made regarding the design.

4) Dynamic: the generated knowledge from the evaluation can guide decisions affecting the modification and possible improvements to the design in accordance with the original aim; in addition, new knowledge can be identified and used in new projects.

The major weaknesses with the EBHDL process model are that it takes time to follow and is expensive: especially the costs for conducting the evaluation might prove to be a hurdle in some projects. It is also important to say that more relevant and applicable evidence for practicing landscape architects is needed.

6 结语

尽管世界卫生组织和欧盟均强调了绿色空间的重要性，但更为重要的是，我们仍需务实、客观地看待其功效——绿色空间并不能直接治疗疾病，只有经过恰当的设计、维护和运用，才能真正改善人类健康水平，促进自然疗愈方法的实施。作为景观设计师，我们有责任认真践行自己的使命，做出基于证据的设计决策，并进行使用后评估，确保设计方案能够达成既定目标。唯有如此，设计方案才能切实改变人们的生活。一位正在使用纳卡地亚®疗愈花园的患者表示：“我在纳卡地亚学到了很多。相信即使治疗结束以后，我也再不会经历过去那般大的压力了。我非常肯定这一点。”正是由于这样的反馈和使用后评估结果，我们相信，付诸更多的时间和精力去运用EBHDL流程模型是有意义且有价值的。**LAF**

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6 Final Words

Although the WHO and the EU believe that green space has a grand and important role to play, we must be realistic and fair in what to expect from green space. Green space does not cure illnesses. Properly designed, maintained, and used, green space can promote good health and support nature-based treatments. As landscape architects, we have a responsibility to do our job thoroughly, which means applying evidence and conducting post occupancy evaluations to make sure the designs actually deliver what we claim they do. When done well, design can have a life-changing impact on people. One patient in the Nacadia® therapy garden said: "I have learned so much in Nacadia. So even when the therapy finishes here, I do not think I will ever go back to having the high levels of stress I had before—I am certain of it." Quotations like this, along with the results of our post occupancy evaluations, make it meaningful and worthwhile to go the extra mile by following the EBHDL process model. **LAF**

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