# HOW EVIDENCE-BASED DESIGN SUPPORTS BETTER VALUE GENERATION FOR END-USERS

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## 1 INTRODUCTION

A growing body of evidence indicates that physical environment affects patient and staffs well-being, healing processes, stress reduction, safety and quality of care provided in healthcare buildings. Basing healthcare design decisions on this evidence and generating actionable advice to achieve the best possible patient, staff and operational outcomes, is what evidence-based design (EBD) is all about. However, information on the effect of the built environment on end-users' health and well-being is still very limited and difficult to establish, especially as regards how well a positive environment could be. It seems premature to formulate EBD guidelines for decision-making and is an area in need of further research. This paper acts as a follow-up to initial preparatory work. Through an extensive literature review, two research questions are addressed: (i) How can EBD be used to support design decision-making? (ii) What is the value of EBD from the patient's perspective? In other words, what does it bring to the end-users of healthcare building? The purpose of this paper is to identify the starting point of these two research questions and to establish the vision to which the questions are directed.

## 2 METHOD

A synthesis of the literature is performed to explore current research on EBD with respect to process (evidence generation) and output (value generation). It was carried out, not only to collect the evidence that relates to value generation, but also, to explore how practical options/interventions help increase the value generation. The literature search employed a three-step strategy. Firstly, a wide range of key words and phrases associated with healthcare, building and environment and user experiences were identified from a framework initially built up from previous work*. Then, the evidence was reviewed by seeking detailed descriptions of how the studies were carried out and how their key findings contributed to value generation. By reviewing the EBD process and output, a conceptual framework was developed to facilitate decision-making in terms of supporting it. In total, 30 papers, reports and books (seven review papers) written in English were included in this paper. It has to be mentioned that this review focused on 'how well a positive environment' can contribute to health benefits, therefore, the evidence of negative impact (e.g. noise) was not included.

## 3 RESULTS AND DISCUSSION

Figure 1 establishes the links between design decision-making (EBD means) and value generation (value output) in a given setting/project by illustrating how EBD can be applied to support design decision-making with four steps. Firstly, when evidence is identified as a potential for implementation, collecting relevant sources available will be very important, to not only accurately reflect the most up-to-date information, but also, to reduce bias and acknowledge uncertainty. EBD draws on knowledge from a multitude of disciplines with varying approaches to knowledge generation and therefore, it is difficult for implementation in practice due to the different level of credibility and also the fact that not all of the design elements collected are equally positive (step 2). As most studies attempt to develop one specific evidence to address specific health outcomes, it is important to realise that the benefits

generated from EBD depend on how it is applied. The evidence synthesization (step 3) will create a new understanding of EBD by analysing findings from different sources of evidence, with a focus on the same topic of interest, and integrate the best evidence that fits into a given situation. The central part of this framework in this paper is the 'value generation' analysis (step 4) which is an essential tool for the early design stage when developing an EBD implementation. It is obvious that the more valuable a piece of evidence, the more confidence one has in the findings for application in building and environmental design, regardless of its source: scientific journal and/or practice. To clarify it, the findings of the literature review were organized with the same structure in the following format: EBD foci were firstly categorized into four groups that relate to end-users' experiences when they are in the immediate building space: positive perception; flexibility usage; accessibility; facilities and maintenance. How EBD adds value for the end-user is also presented. Practical options are then specified with a number from I to IV indicating the level of credibility.

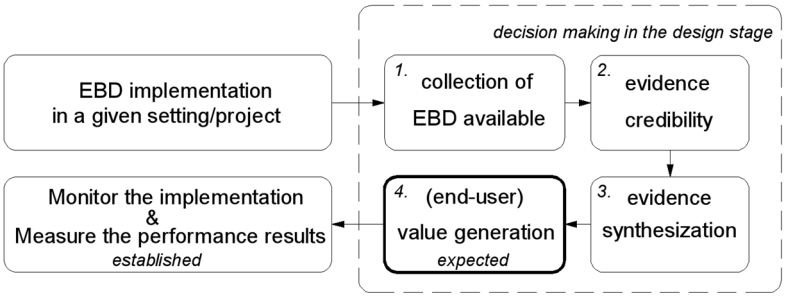


Figure 1: links between design decision-making (EBD means) and value generation (value output).

## 4 LIMITATION AND CONCLUSION

- The evidence base in healthcare design is not yet comprehensive enough to support all decision-making contexts. This paper proposed an alternative view of EBD, exploring how the concept of EBD supports better value generation for end-users. It presents the starting point of our research in this area, an exercise in critical reflection and appraisal and a holistic view of EBD integration that supports value generation which will be a promising area for healthcare building research.
- As this study is still at the initial stage, it is limited to a conceptual approach that still has to be explored in a qualitative/quantitative empirical setting. Also, when collecting evidence that can make a difference to end users, some factors have a negative or positive impact; some have to take into consideration trade-offs in order to maximize environmental benefits. Therefore, the review may have been over-simplified when only positive impact was included in.
- Despite this, it makes a contribution to EBD research and its better links to value generation as a concept, by focusing on the end-user perspective. It raises issues about the nature of how EBD helps to increase the user value and offers an understanding of the future research necessary to support healthcare building and built environment at the design stage.s are considered important tools that can quickly convey a message by using text, figures, photos, and graphs aiming at promoting understanding.

* **Zhang Y.** Tzortzopoulos, P and Kagioglou M. (2016) A Lean Way of Design for Healthcare Buildings and evaluation its impact on occupants' wellbeing from a holistic perspective, International Group for Lean Construction (IGLC) - 24th Annual Conference 2016, 20th to 22nd July 2016, Boston, USA, pp53-62