

# *An affordance-based approach to architectural theory, design, and practice*

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*The idea of affordance, borrowed from perceptual psychology, is applied to the domain of architecture. As to architectural theory, affordances can be used as a conceptual framework to understand the relationship between environments and occupants, especially with respect to form and function. Regarding architectural design, the concept of affordance allows for a common theoretical basis to improve the design process. Concerning architectural practice, affordances can be used as a tool to explore the connection between the intentions of the design with how the artifact is actually used, leading to archived knowledge, and the potential for avoiding common design failures.*

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‘Architecture and design do not have a satisfactory theoretical basis,’ wrote psychologist James J. Gibson three decades ago. He then asked ‘Can an ecological approach to the psychology of perception and behavior provide it?’ (Gibson, 1976). Clearly his opinion was yes, and we agree. In this article we expand upon this idea by applying Gibson’s concept of *affordance* to the design of artifacts in general and in particular to the domain of architecture. In previous work we have applied the concept of affordance more specifically to the field of engineering design, where we have argued that the concept of affordance is more fundamental than other extant concepts, particularly that of *function* (Maier and Fadel, 2001, 2002; cf., Brown and Blessing, 2005). In this article we argue that, as in engineering, the concept of affordance is more fundamental to architecture than other often studied concepts, particularly that of *form*. One of our goals in this paper is therefore to show how the idea of affordances applies to a theoretical basis for architecture, in an answer to Gibson’s provocative question.

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Our application of affordances to architecture rests upon three main propositions, which we explore in the remainder of this paper. First, as to architectural *theory*, we assert that affordances can be used as a conceptual framework to understand the relationship between built environments and humans over time, especially with respect to the form, function, and meaning of architectural elements. Second, regarding architectural *design*, we propose that the concept of affordance allows for a common theoretical basis to improve the design process by offering a shared language among those involved in a design project, particularly architects and engineers. Third, regarding architectural *practice*, we believe that affordances may be used as an evaluation tool to explore the connection between the initial intentions or objectives of the design with how the artifact is actually used, leading to archived knowledge for use in future projects, and the potential for avoiding an array of common design failures.

In this regard we echo and expand upon some points made by Koutamanis in his application of the idea of affordance to building elements and spaces. He states 'Affordances promise integration of different viewpoints (architects, engineers, clients, users) and continuity, i.e., compatible expressions of functionality and usability throughout the lifecycle of a building (briefing, design and use). This holds promise for the codification of design knowledge: affordances could support direct matching of an existing building or type to a specific brief, thus allowing for early evaluation and refinement of design or briefing choices' (Koutamanis, 2006). Before expanding upon these ideas further, the concept of affordance needs to be explored and understood, as presented in the next section.

## *1 A generalized theory of affordances*

### *1.1 History of the idea of affordance*

The perceptual psychologist James J. Gibson first put forward the theory of affordances. In other work, the present authors have expanded upon this theory, and identified new application areas (Maier and Fadel, 2001, 2002, 2003, 2005, 2007, in press). Following our introduction of the concept into the engineering design community, other authors have also begun using the concept of affordance within engineering design and industrial design research (e.g., Galvao and Sato, 2004, 2005, 2006; Brown and Blessing, 2005; Kim et al., 2007). In this section, we briefly review our generalized theory of affordances (see Maier, 2005, Maier and Fadel, in press, for a more complete discussion) with a focus on its applicability to architecture. We begin with Gibson's original definition. Gibson coined the term 'affordance' as follows (all emphases are his):

The *affordances* of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or ill. The verb *to afford* is found

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