

Spatial Affordances within Learning Environments

Research plan

AR3AP100 Public Building Graduation Studio

The Vertical Campus

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1. Introduction

The intended use of a book may have been to share knowledge. But if the need arises, it might as well be used as a doorstopper if it is recognized as such. Place the book next to a phone and those who are old enough to remember will know that it is a phonebook. Or someone who happens to be illiterate, but smart enough to notice that the book is heavy, may use it to knock some sense into someone else. While the use changes, the book itself does not change - it is invariant and has been offering these uses from the start. However, it can afford different uses¹ based on the perceived properties, the experiences of the perceiver and the context in which it is placed. Similarly, a building affords a certain use as well. It might have been designed for a specific purpose but can be used differently if the need arises. All of this can happen while the building itself barely changes. Like the book, part of it is invariant and has been offering these uses from the start.

This counts for educational buildings as well. Within the Public Building graduation studio of 2023/24, we are tasked with developing the Vertical Campus of the future in The Hague. This signals that the Vertical Campus is going to deal with possible changes in educational methods, which eventually leads to a different way of using educational buildings.

2. Problem statement

Even before the covid-19 pandemic, a trend could be seen of students rediscovering the campus (figure 1). Clearly, home is not a place that affords studying for every student. This explains the growing number of students spending time on campus and the problems that arose when they were forced to study at home because of covid-related regulations. Even without external influences, educational methods and therefore the way we use learning environments are bound to change².

Much happens to the building after the architect is gone. The problem is that we can hardly predict what these future uses are going to be like, which puts educational buildings in a precarious position: how are they going to deal with changes in use that are yet to come? This precarity calls for the need to adopt multiplicity into the design. This allows for educational buildings to afford different uses and accommodate for a change in educational trends, where it would have been monofunctional otherwise. But the way of achieving and even more so communicating this multiplicity towards the user requires attention. The different uses that a learning environment offers should not be lost in translation, or worse, not be perceived at all. Instead, learning environments should be able to offer a rich collection of uses that is readily apparent to the user.

Simultaneously, much effort has gone into researching and re-interpreting the meaning of affordances within the field of Peircean semiotics where the relation between perceived and perceiver is emphasized. Peircean semiotics and Gibson's affordances relate to each other because of this emphasis: the interpretation of the relation between object and what is signified influences the affordance. However, a translation into architectural

¹ James J. (James Jerome) Gibson, *The Ecological Approach to Visual Perception*, Resources for Ecological Psychology (Hillsdale, New Jersey: Lawrence Erlbaum Associates, Publishers, 1986).

² Jill Blackmore et al., 'Innovative Learning Environments Research Study' (Melbourne, Australia: Deakin University, 2011).

De universiteit zit weer stampvol

Campus Studenten studeren steeds vaker op de universiteit. „In Utrecht staan ze om acht uur rijen dik voor de Universiteitsbibliotheek.”

Maarten Huygen 13 februari 2017 Leestijd 3 minuten



Flexibel studeren op de VU in Amsterdam. Universiteiten moeten oplossingen bedenken voor de grotere toeloop.
Foto's Olivier Middendorp

Figure 1. Maarten Huygen. “De universiteit zit weer stampvol”, *NRC*, 13 Feb. 2017 (<https://www.nrc.nl/nieuws/2017/02/13/de-universiteit-zit-weer-stampvol-6681554-a1545866>, accessed on 5 Nov. 2023)

discourse rarely happens, even more so in the case of learning environments³. The properties of our environments encourage a certain use, but this relation is underutilised in the design process of educational buildings. Therefore, the views of architects and users are unaligned: It is unclear what the design should offer, while the user is unable to clearly distinguish the uses that are in fact offered. Guidelines on how properties such as materiality, dimensions and space syntax encourage the user towards a certain use is lacking.

In brief, there is a risk of learning environments not clearly communicating their range of possible uses, their multiplicity, towards the user. While research has been done on affordances and how they encourage a certain use, these findings are rarely applied within the design of educational buildings. Therefore, the research question follows:

³ Fiona Young and Benjamin Cleveland, ‘Affordances, Architecture and the Action Possibilities of Learning Environments: A Critical Review of the Literature and Future Directions’, *Buildings* 12 (13 January 2022): 76, <https://doi.org/10.3390/buildings12010076>.

How can spatial affordances be used in the design of learning environments to improve the legibility of their multiplicity?

2.1 Problem significance

First, there is a need for multiplicity in learning environments. The traditional, monofunctional classroom runs the risk of not keeping up with changing educational trends. Simultaneously, poorly communicated affordances and multiplicity lead to user dissatisfaction. In the case of learning environments, an environment that only clearly affords one specific use does not live up to its potential since the general public will not recognize in which other ways it can be used. It's true that a building will be demolished anyhow, but the mentioned problems will only lead to buildings less capable of standing the test of time. A better understanding of how affordances are used in design allows for the creation of more suitable and sustainable learning environments.

Second, there is a knowledge gap where affordances are scarcely translated into architectural guidelines. While affordances have been part of the discourse, they have barely been applied to architectural practices. Knowledge on how to properly incorporate affordances is implicitly learned through experience, which is a problem for students and young professionals in the field of architecture who are yet to attain this experience.

3. Methodology

The goal of this project is to gain knowledge on the use of affordances in design and how they can be used to design learning environments that clearly communicate their different uses. These findings are translated into a catalogue of design principles which in turn inform design options. By keeping the design of a vertical campus in mind during the research and how it relates to affordances, design options can re-inform the catalogue and vice versa. The research diagram (figure 2) visualizes this process.

3.1 Literature studies

The focus of this project is on affordances in learning environments, which generally can be seen as teaching and learning. These relate to actions based on how the human body interacts with learning environments, for example: walking, standing, sitting, speaking. The scope of this project is limited to the spatial qualities of these environments, considering which elements make the affordance to be invariant. Examples of literature that delves into affordances are the works of Rietveld⁴, which starts to zoom in on architecture – but often lingers on theory. Baggs and Sailer⁵ continue by questioning if architecture should take a more human-centric approach with affordances, while Stam et al.⁶ claim that architecture influences behaviour by balancing between specificity and openness.

⁴ Erik Rietveld, 'A Rich Landscape of Affordances', *Ecological Psychology* 26 (28 October 2014): 325–52, <https://doi.org/10.1080/10407413.2014.958035>.

⁵ Edward Baggs and Kerstin Sailer, 'Letting the Affordances Fool around: Architectural Space from the Users' Point of View', *Adaptive Behavior*, 9 January 2021, <https://doi.org/10.1177/1059712320983050>.

⁶ Liesbeth Stam, Peter-Paul Verbeek, and Ann Heylighen, 'Between Specificity and Openness: How Architects Deal with Design-Use Complexities', *Design Studies* 66 (January 2020): 54–81, <https://doi.org/10.1016/j.destud.2019.11.010>.

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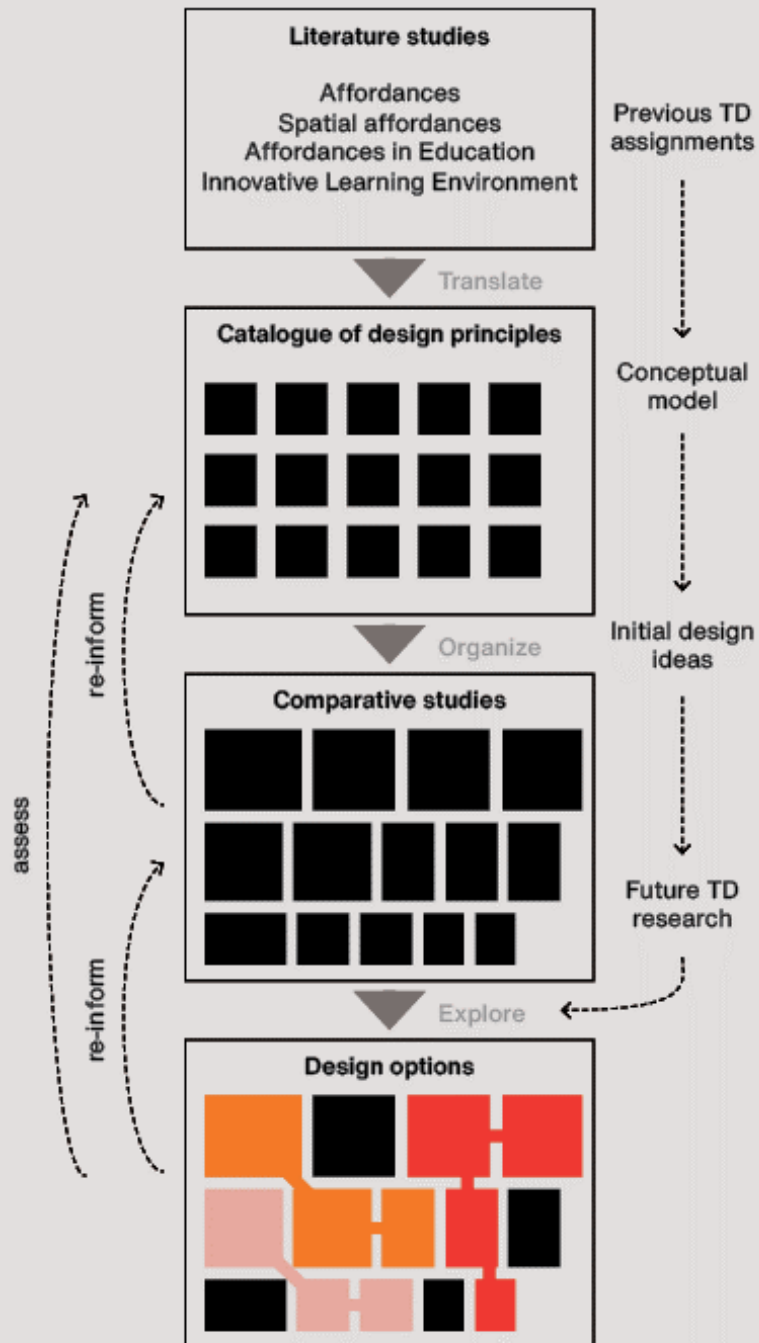


Figure 2. Research diagram depicting the methodology of translating literature studies on affordances into design options for educational buildings. *Illustration by author.*

Research into *Innovative Learning Environments* (ILE) helps connecting earlier findings into the field of education. Initial readings have shown that a better understanding of learning environments helps to achieve the necessary requirements early in the design process⁷. The aim here is to bridge the gap between what learning environments are supposed to offer and how the spatial configuration of these environments displays these possibilities.

3.2 Catalogue of design principles

By paying close attention to recurring themes, earlier findings will be translated into a catalogue of design principles. These principles address on one hand the requirements needed for learning environments, on the other hand how they are made apparent to the user. The objective is to create principles that guide the design towards a clear language of affordances, so that users are stimulated to understand how a space can be used. These principles range from intimate details and materiality to overarching themes such as space syntax.

3.3 Comparative studies

These principles are compared to actual learning environments in The Hague (ROC Mondriaan, InHolland, Leiden University). This brings a critical review to earlier findings, showing which principles are already represented and tested in practice, or which are currently lacking and to be improved.

Consequently, a clear structure is given to the catalogue. Giving priority or further refining certain aspects of the catalogue enhances the translation from theory to design principles and how they are applied to design options.

3.4 Design options

The research results in a catalogue but does not stop there. Exploring different design options that give shape to affordances in learning environments once again tests which principles work best in which situations. Furthermore, different options give new insights into how the principles can be combined to achieve a more convincing result.

Ultimately, the literature, catalogue, comparative studies and exploration of design options work hand in hand throughout the project. The goal is not to give a definitive set or rules that dictate how affordances are used in architecture, but how they can be incorporated into the design process of this specific project.

⁷ Young and Cleveland, 'Affordances, Architecture and the Action Possibilities of Learning Environments'.

4. Relevance

Before landing upon the current topic and objective of my project, initial research immediately led to flexibility and adaptability of buildings in the sense of creating a machine that transforms according to changing demand. Cedric Price, for example, who gifted me with the obsession that *architecture is too slow*⁸, designed the Fun Palace – a framework that allows rooms, walkways and stairs to move around within a framework. The larger discourse, when confronted with terms such as flexibility and adaptability, seems to immediately turn towards designs like Cedric Price’s Fun Palace: a machine that can change according to what society demands of it. With my project I aim to circumvent this pitfall by approaching the problem from a different angle: what if, instead, the user can more easily adapt within the building by understanding the different possibilities of how the building can be used, instead of the building adapting to a change in demand?

⁸ Boris Jardine, review of *Review of From Agit-Prop to Free Space: The Architecture of Cedric Price*, by Stanley Matthews, *Leonardo* 41, no. 5 (2008): 528–29.

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