Schools as Social Complexes.
How Space affords Self-directed Learning

Ahmed Tarek Zaky Fouad[1] and Kerstin Sailer[2]

1 SPE, University of the West of England (UWE)
2 The Bartlett School of Architecture, University College London

Published in: ARCH+, Zeitschrift für Architektur und Urbanismus, 55. Jahrgang, Nr. 249, September 2022, S. 32-34 (original title in German: "Schulen als soziale Komplexe. Raumangebot für ein selbstgesteuertes Lernen.")
https://archplus.net/de/archiv/ausgabe/249/

"[We can understand] architecture as a system of possibilities, and how these are restricted by laws which link this system of possibilities to the spatial potentialities of human life."[1]
Bill Hillier

Buildings are social entities. They channel and distribute movement flows and structure who we encounter where and when. Architects can shape how sociable a building might become in use through its spatial layout and its power to bring people together or keep people apart.[2] Following this line of reasoning proposed by Bill Hillier and Julienne Hanson in the 1980s as the theory of space syntax, we might expect that the spatial layout itself orchestrates the occurrence, frequency and distribution of activities in space, at least for times outside of the structured curriculum imposed on students.

Learning as an activity can be differentiated into two types: firstly, there are teacher-directed activities, mostly occurring during class-time according to tasks and structures driven by the teachers, such as attending lectures and doing tests. Secondly, there are further individual and collaborative student self-directed activities, initiated by the students outside class-time and cultivating the concept of constructivist social learning.[3] These are examples of informal learning practices inside a school with less control from the teachers and more room for student self-motivation, self-regulation and self-assessment. This could

possibly include independent reading, revising, solving problems or just interacting with peers. Self-directed learning requires a degree of autonomy for students to choose their activity type, level of concentration and privacy, grouping, seating layout and posture, thus, allowing for the spatial design of learning spaces to influence the student-chosen activities.

Affordances as Action Possibilities Latent in the Environment

Considering student self-directed activities, their existence and diversification is contextual, thus building on what learning spaces offer. The spatial design of a school creates affordances, or in other terms, action possibilities for learning activities to unfold. Affordances were first defined by James J. Gibson as information available from an environment that in turn provides cues for behaviour.[4] Erik Rietveld and Julian Kiverstein have called an environment a 'rich landscape of affordances,' i.e., offering a multitude of possibilities for action depending on relations between space and users, but also sociocultural practices and individual engagement.[5]

The affordances of the learning spaces for informal learning opportunities are primarily shaped through the design, with many attributes that could shape those affordances and accordingly define the potential patterns of student interactions and self-directed activities. The spatial configuration is one key design attribute which constitutes how spaces are organised, linked and related to each other in the building. Accordingly, it defines the visibility and accessibility of each space, where spaces that are easily reached from all other spaces are highly visible and accessible, i.e., shallow, whereas the opposite scenario reflects deeper and segregated spaces. Moreover, the functional allocation (as a second attribute) prescribes what usage is assigned to each space and who is expected to use it, in this context, students, teachers or both. To demonstrate how these design attributes impact informal learning activities by students, we shall attempt an analytical comparison between two different school layouts.

A Tale of Two Schools

Visiting a building in use tells a story of its users and their patterns of activities. Consider walking through two different secondary school buildings in London at around 1pm during the lunch break. The main corridor of one school reveals diverse types of student activities, such as independent reading, revising, working on homework or just interacting. Those

activities are spread within open-plan learning spaces or extend towards the corridor itself. Another walk along the main corridor of a different school uncovers a different, much quieter atmosphere, where the closed-plan cellular classrooms are empty, and the student presence in corridors is minimised to a few individuals standing and whispering. Without attempts to assess which of the previous example is a better school, the question arises how the design of learning spaces impacts the learning activities and the student social life inside those two school buildings?

The design of school A is realised as a compact building, portraying a mix of allocated functionalities in one floor, including classrooms, studios and teacher offices, in addition to services. These functional spaces are arranged in a configuration that highly emphasises the large, shallow and central open-plan studio, merging it into the main corridor. Accordingly, the open-plan studio is highly accessible, when considering the metric of visual mean depth of the school building (Figure1).[6] While the open-plan studio accommodates formal teaching (during class-times), it potentially operates as an informal learning space during breaks. Its configuration *affords* student interactions, maximised by the configurational accessibility that brings passers-by (in corridors) towards the occupiers (in studio). Moreover, the available furniture (e.g., stepped seating, tables and benches) *affords* collaborative self-directed activities, yet also allows a student to isolate themselves for an individual task. All those potential activities happen in close proximity to and supervised by teachers, whose allocated offices across the corridor from the studio are visually connected to the open studios; or by the effort of natural surveillance, as teachers move along the corridor that merges into the open-plan studio.

The design of school B is different from school A as it is split into two wings. While each wing offers classrooms and some offices, the wing configuration maintains closed boundaries between different spaces with no visual connection across. Classrooms are therefore less visually accessible, compared to the open-plan learning spaces of school A. Furthermore, the furniture available inside the classroom is limited to conventional rows of individual desks. Even the wing corridor is narrow with little area for student gatherings outside the classrooms, with the exception of one break-out space along the corridor connecting both wings. In sum, this design potentially *affords* fewer informal activities to happen during breaks, due to the lower movement potential as well as lower levels of co-presence or interactions inside the closed classrooms; due to the furniture that does not

promote collaboration in its fixed row arrangement; and finally, due to the lack of natural teacher surveillance from corridors or their closed offices.

Figure 1: Visibility levels of level 4 in school A (top) and of level 2 in school B (bottom).

The different opportunity structures in school A and school B as emerging from the spatial design are also used differently in everyday life. It important to note, however, that

behaviours do not only stem from design variations, but also come from variations in managerial operations of the two schools. School A provides more freedom to students during breaks, through lenient rules and less control by teachers. This operational model allows the rich affordances for informal learning emanating from both spatial configuration and functional allocation to establish its impact on student interactions and self-directed activities (Figure 2). By contrast, school B has minimal student informal activities happening inside its wing structures. While this partially corresponds to the lower potential for informal activities through the isolated wings, narrow corridors and cellular classrooms, it is simultaneously driven by the managerial regulations that embrace this design to support only formal in-class teaching occurring in the wings. Consequently, student co-presence and subsequent activities were minimised. School B's break-out space situated in the corridor between the wings is a clear example of how managerial operations can override the original design intentions and impact the realisation of affordances for informal activities. During breaks, student self-directed activities or interaction were absent from the break-out space, despite its high interaction potential, being allocated along the main artery between both wings. This is a consequence of rules that restrict students from using the space.[7]

Schools as Spaces of Freedom

The design of learning spaces is capable of creating learning opportunities, especially for informal learning practices that arise from student autonomy over self-directed activities and interactions with minimal control exerted by teachers. The built environment is perceived as a rich landscape of affordances for those learning activities. The opportunities built into the design and actual space usage patterns vary between schools. Those differences are not only due to design variations, but deeply embedded in managerial operations and how they shape student preferences and behaviours. Schools are complex organisations whose built environment contributes to the learning process, as portrayed through informal learning activities. The spatial design comprises multiple design attributes that create a design potential for use. The spatial configuration of a school is a crucial contributor to movement and co-presence as a foundation for student interactions and self-directed learning activities. The design decision of mixing functionalities, thus bringing different users into close contact, maximises the potential emergence of informal activity and possibly creates an environment of teacher natural surveillance over those activities.

Student preferences informed by spatial opportunity structures can only emerge within a less-controlled environment that allows students to select freely from the rich affordances built into space.

---

[1] Hillier, B. (1996). *Space is the machine. A configurational theory of architecture*. Cambridge. Online at: http://eprints.ucl.ac.uk/3881/: Cambridge University Press, p.10.
[2] Hillier, B., & Hanson, J. (1984). *The social logic of space*. Cambridge: Cambridge University Press.
[3] Social constructivism recognises the built-up of knowledge in the student mind, individually or more importantly in collaborative learning communities, as the prime method of learning.
[4] Gibson, J. J. (1986). *The ecological approach to visual perception*: Lawrence Erlbaum Associates.
[5] Rietveld, E., & Kiverstein, J. (2014). A Rich Landscape of Affordances. *Ecological Psychology, 26*(4), 325-352.
[6] Visual mean depth is a Space Syntax measure, evaluating how each space is quantitatively accessible (shallow) or segregated (deep) in the building configuration, through the average count of visual turns to reach this space from every other space; the lower the values the more integrated (shallow) the space is. For more information, see: Fouad, A. T. Z., & Sailer, K. (2019). *The Design of School Buildings. Potentiality of Informal Learning Spaces for Self-Directed Learning.* Paper presented at the 12th International Space Syntax Symposium, Beijing, China.
[7] For more details on the full study design, please consult the PhD study of the first author: Fouad, A. T. Z. (2021). Implications of the Spatial Design of School Buildings on Student Interactions and Student Self-Directed Learning Activities. (PhD). University College London, London.