BENJAMIN CLEVELAND

7. EMERGING METHODS FOR THE EVALUATION OF PHYSICAL LEARNING ENVIRONMENTS

CONTEXT

The field of post-occupancy evaluation (POE) has provided direction on how evidence can be gathered about the performance of educational facilities for over 40 years (Cooper, 2001). However, such work has generally overlooked the evaluation of learning spaces for pedagogical effectiveness, i.e. the suitability of the physical environment in supporting desired teaching and learning practices, activities and behaviours.

This chapter calls for, and introduces, new methods of learning environment evaluation that attempt to make explicit the connections between pedagogy and space. It also outlines a suggested framework for the further development of such methods.

The research is currently being conducted at the University of Melbourne in connection with the *Evaluating 21st Century Learning Environments* (E21LE) ARC Linkage project. Findings so far have indicated that a return to the origins of post-occupancy evaluation in the field of environmental psychology is required to support the development of evaluation methods that take into account both the physical and social components of the environment. Feedback is needed on just how effective specific 'units of the environment' (Barker, 1968) are as pedagogical settings.

BACKGROUND

What are commonly termed 'new generation learning environments' (NGLEs) – defined here as learning spaces that provide a greater degree of spatial variation, geographic freedom and access to resources for students and teachers than traditional classrooms – are becoming common-place in Australian schools. The proliferation of these 'non-traditional' learning spaces has become a phenomenon as new facilities are built and existing facilities are refurbished (Saltmarsh, Chapman, Campbell, & Drew, 2014). However, not all NGLEs are equal: a variety of spaces tend to be grouped under this umbrella. In the primary and secondary school sector, Dovey and Fisher (2014) identified at least five distinguishable building typologies that could be considered NGLEs. These range from classrooms that have been updated with contemporary furniture and digital technologies, to transformable spaces that can be opened-up or closed-down through the use of sliding panels, to large open

W. Imms et al. (Eds.), Evaluating Learning Environments, 93–105.

spaces that commonly feature interior elements that help situate diverse teaching and learning activities.

The variety of 'new' facility typologies being built in Australia, and internationally (OECD, 2013), has provided a rich testing ground for updating pedagogical practice, both in individual schools and across whole school systems. With such an opportunity comes the need to evaluate these learning environments to determine which are best supporting desired teaching and learning practices, activities and behaviours.

The conclusions of a journal article co-authored by this writer in 2014 provide the 'launching point' for this discussion. Based on a critical review of the literature on the 'evaluation of physical learning environments' Cleveland and Fisher (2014) formed the following conclusions:

1. Approaches to evaluations that attempt to assess the effectiveness of physical learning environments in supporting pedagogical activities are in their infancy and require further development.
2. More research is required to develop rigorous methodologies and methods that can be confidently employed to assess the effectiveness of physical learning environments in supporting desired teaching and learning practices, activities and behaviours.
3. Such research could profit from an interdisciplinary approach that involves people from a variety of backgrounds, including but not limited to education, human geography, environmental psychology and architecture.
4. The development of formative evaluation methodologies, which could support the evaluation of educational facilities throughout their lifecycle, appears to be warranted (pp. 24–25).

Building on these conclusions, this chapter provides a suggested framework for the requisite research suggested above. In doing so, it discusses some of the work currently being undertaken by members of the Learning Environments Applied Research Network (LEaRN) at the University of Melbourne through an ARC Linkage project titled, *Evaluating 21st Century Learning Environments* (E21LE). This research is based on the contention that if physical learning environments are to be considered as spaces that provide a range of affordances for teaching and learning, then improved methods are required to evaluate the effectiveness of 'units of the environment' (Barker, 1968) as pedagogical settings.

To support arguments for evaluation methodologies and methods that can take into account the influence of 'units of the environment' on the experiences of teachers and students (i.e. pedagogical practice – see later in this chapter), a brief literature review is provided. It covers a range of issues concerning the field of evaluation and the domains of environmental psychology and critical human geography. The literature reviewed (1) explores selected theories that have informed the field of evaluation and some pragmatic issues that evaluators should take into account when

setting-up, conducting and reporting on evaluations, and (2) identifies the relevance of the domains of environmental psychology and critical human geography to learning environment evaluation.

Subsequently, after briefly discussing the metrics by which the 'performance' of educational facilities have been measured in the past, this chapter suggests future directions for research and evaluation and introduces the chapters that follow in the 'Emerging methods' section of this book.

LITERATURE REVIEW

Evaluation: Approaches to Assessing Value and Supporting Decision Making

Defining evaluation: an evolving concept and tradition. Evaluation is understood in various ways. Højlund (2014, p. 28) suggested that "evaluation is commonly understood as a tool informing policy-makers and civil servants of what works and what does not". However, evaluation has been defined in alternative ways by various experts, revealing the broad scope of the concept and some differing perspectives on what evaluation is and what 'work' it can do.

Scriven (1991) defined evaluation as the systematic determination of the quality or value of something; Cousins, Goh, Clark, et al. (2004) defined evaluation as a process of systematic inquiry leading to judgements about the merit, worth and significance of a program or organisation; Davison (2004, p. 85) defined evaluation as the "application of values to descriptive data so as to say something explicit about the quality or value of the evaluand in a particular context"; and Johnson, Greenseid, Toal, King, Lawrenz, and Volkov (2009, p. 378) defined evaluation as "any application of evaluation processes, products, or findings to produce an effect".

The literature indicates that the general logic of evaluation is inherently realist and rational and associated with assumptions about rationality and causality (Højlund, 2014). Carman (2011, p. 351) commented that such logic tends to "place a high value on the rational, objective, and technical aspects of evaluation, with a considerable focus on using evaluation to make decisions" – a perspective firmly grounded in rational choice theory. However, Højlund (2014) suggested that the literature shows that evaluations rarely do change policies and that this constitutes a paradox, "since the very objective of evaluation is to improve policy" (p. 26). Commenting further, Højlund proposed that, "ideally, evaluation improves policy through the instrumental application of an evaluation's results (conclusions and recommendations)" (p. 29), yet went on to suggest that "positivist assumptions behind evaluation have been weakened somewhat over the last decades, as positivism [has been] challenged by phenomenological and hermeneutic traditions as well as critical theory" (p. 29), thus highlighting a trend towards more relational, rather than rational, framings of evaluation.

Evaluating: what, why and how. Davison (2004) suggested that evaluations are generally conducted for two purposes: (1) to find areas for improvement; and/or (2) to generate an assessment of overall quality or value for reporting or decision-making purposes. Davison identified the following things as commonly evaluated:

- Projects, programs or organisations;
- Personnel or performance;
- Policies or strategies;
- Products or services;
- Processes or systems;
- Proposals, contract bids or job applications (Davison, 2004, p. 1).

In framing evaluations, Davison (2004) suggested that the purpose of an evaluation should be carefully considered. If evaluating for accountability, she suggested that it was best to have an independent evaluation, but if the goal was more focussed on organisational capacity building or learning, she concluded that it was important to include stakeholder participation (a more relational framing of evaluation).

Evaluation theories may describe and prescribe what evaluators do, or should do, when conducting evaluations (Coryn, Noakes, Westine, & Schröter, 2011). Coryn et al. suggested that evaluation theory helps to guide people's choices about "evaluation purposes, users, and uses, who participates in the evaluation process and to what extent, general activities or strategies, method choices, and roles and responsibilities of the evaluator" (p. 199). To improve the likelihood of a good fit between an evaluation and its environment, Chelimsky (2013) concluded that people involved in setting-up evaluations (i.e. evaluators) should also consider: (1) the kind of evaluation that may be feasible, based on what has been learned about the program context and especially its history; (2) the types of evaluation questions that will be possible to answer; and (3) the appropriate individual or combined methods (p. 94).

To this end, Carman (2011, p. 368) commented that it is important to understand "why an organization chooses to engage in evaluation and how it intends to use the information". She suggested that such information can "help evaluators to make important decisions relating to evaluation design, data collection, and measurement". Further-to-this, Chelimsky (2013) counselled that as evaluations are performed in the real world, they are open to "political pressures by policy makers, planners, administrators, special interest groups, subject-area practitioners, participants, and all those who may be affected by the results—or feared results—of the evaluation" (p. 92). She suggested that such influences should be recognized and accounted for in appropriate ways and recommended that for an evaluation to be viable, the design must: examine contextual factors; set up a plan for dealing with potential problems of credibility and use; and lay a foundation for predicting and tracking the key external factors likely to affect the evaluation from beginning to end (p. 94).

With regard to reporting on evaluations, Chelimsky (2013) identified that it is important to produce a report that is technically accurate, but also clearly written

and without jargon. She suggested that reporting should not simply take the form of written reports and that face-to-face briefings and presentations to those involved in the evaluation, and especially those in a position to affect use, should be conducted to enable the processes, products and findings of an evaluation to be appropriately shared.

Finally, Davison (2004) concluded that it is important to take the time to critically review the quality of an evaluation itself. She suggested that evaluations should be judged on the following criteria: (1) the validity of their conclusions, (2) their utility to relevant stakeholders, (3) the way in which they were conducted, (4) credibility, and (5) cost.

Environmental Psychology, Critical Human Geography and Education

Weinstein (1981) proposed that physical environments can have an impact on learning by moderating social, psychological and instructional variables. Based on findings from environmental psychology studies into person-environment relations, she suggested that the physical spaces in schools can facilitate or inhibit learning through both 'direct effects', such as noise or crowding, and through 'symbolic effects', such as when poor conditions communicate to students a lack of respect for them on the part of the school they attend. For these reasons, Weinstein recommended that learning environments in schools should be considered as important as the curriculum and that the physical aspects of learning should be carefully planned by teachers in order to match with teaching objectives and the learning needs of students.

Weinstein's perspective, derived from the traditions of environmental psychology (e.g. Barker & Gump, 1964; Barker, 1968, 1976), provides a foundation for the arguments put forward in the later parts of this chapter with respect to re-framing of methods used to evaluate physical learning environments (see 'Renewed approaches to the evaluation of physical learning environments'). To appropriately situate these arguments in the literature, this section of the chapter provides some important background on the fields of both critical human geography and environmental psychology.

Soja's critical human geography. Soja (1989) suggested that only recently (from the 1980s) has the interpretive significance of space been recognised within the realms of critical social theory and given rise to the discipline of 'critical human geography'. It was his contention that the influence of space should be considered more rigorously when seeking understandings of the social world. He proposed that critical human geography opened up avenues for the interpretation of social histories and settings through a critical spatialization. Such an approach, he claimed, may complement the temporal or sequential time-based histories that have historically been central to critical social theory. Soja promoted his approach to understanding 'space-time-being' as follows:

> Just as space, time, and matter delineate and encompass the essential qualities of the physical world, spatiality, temporality, and the social being can be seen as the abstract dimensions which together comprise all facets of human existence. … How this ontological nexus of space-time-being is conceptually specified and given particular meaning in the explanation of concrete events and occurrences is the generative source of all social theory, critical or otherwise. (1989, p. 25)

Relating these ideas about 'space, time, being' to schools, Fisher (2002) argued that:

> Critical human geography is another of the disciplines … [that is required] in order to make some theoretical sense of why schools, as political places and spaces, are seemingly unconscious of the power of space. (p. 167)

Lived experience of space: the value of the user perspective. Building on Soja's ideas, Lees (2001) recommended a critical ethnographic approach to drawing out meaning within the context of a critical geography of architecture. She suggested that in order to gain understandings of architecture from a critical geographic perspective we must go beyond trying to understand architecture from a representational viewpoint and investigate the ways spaces are socially produced.

Providing a backdrop for these ideas, Lefebvre (1991a) argued that the production of space is never innocent and championed the spatial perspectives of inhabitants, or users, of different spaces. It was his contention that inhabitants felt space more than thought about it and therefore they encountered a concrete or subjective view of space through their lived experience (Merrifield, 2000). Furthermore, he suggested that the lived experience of space went beyond the visual to become experienced through all the senses.

Lefebvre juxtaposed these ideas about the lived experience of space with the ways in which he suggested architects and planners often experience and encounter space. It was his contention that architects and planners often operate within, and experience space, in the abstract stage of the design phase. Believing that user experience of space should be more closely considered when trying to understand the significance of space, he commented that, "what we are concerned with here is not texts (blue prints) but texture" (Lefebvre, 1991/1997, p. 138). In supporting Lefebvre's ideas about how to approach an understanding of architectural design, Merrifield (2000) stressed the importance of thinking about whose space we mean.

Behaviour settings theory. Behaviour settings theory was established by Barker (1968, 1976), an ecological/environmental psychologist, and his colleagues (Barker & Gump, 1964; Gump, 1974, 1980; Schoggen, 1989) to explain the influences that 'units of the environment' (behaviour settings) have on human behaviour. Together, they demonstrated that recognisable units of the environment

have a powerful influence over the ways people behave. They found that behaviour settings often had a stronger influence on people's behaviour than a person's individual inclinations. Scott (2005) explained this further. He suggested that behaviour settings coerce people to conduct themselves in certain ways as they encountered particular settings.

Behaviour settings theory recognises physical and social components of each unit of the environment. The physical components, or milieu, are characterised by a specific set of time, place and object props, and the social components are characterised by a set of attached 'standing patterns of behaviour' (Barker, 1968). Thus, behaviour settings are composed of a variety of interior entities and events, including people, objects (e.g. chairs, walls, pens, paper, computers), behaviour (e.g. lecturing, listening, sitting), and other processes (e.g. air circulation, sound transfer) (Barker, 1976). These components of the environment form patterns that constitute the boundaries of a behaviour setting and distinguish one setting from another. Bechtel (1977, p. 33) described the boundary of a behaviour setting as, "the place where the behaviour stops". Gump (1980) further stratified the physical components of behaviour settings to isolate the physical milieu from the human components. He identified three major components of behaviour settings: milieu, human components and program.

Heft (2001) concluded that although behaviour settings exist independently of individuals, they "occur naturally as a function of the collective actions of a group of individuals" (p. 253). As a result, behaviour settings do not change as individuals enter or exit, as long as an adequate number of individuals remain. To this end, Barker (1976) suggested that "it is common observation that the same people and objects are transformed into different patterns as they pass from one variety of setting to another" (p. 19). Indeed, both the physical and social components of a behaviour setting must be present for the setting to exist (Scott, 2005). For example, a game of cricket may be recognised as a behaviour setting. For this behaviour setting to exist, a sporting field and the required equipment must be present along with the required behaviours of the players. Should any one of these components be absent then the behaviour setting would cease to function.

Bechtel (1977) and Schoggen (1989) suggested that behaviour settings are often bounded by architecture. Both contended that architectural space can play a significant role in establishing behaviour settings by determining the physical boundaries of behaviour settings. Further to this, Bechtel (1977, p. vii) suggested that behaviour settings theory could provide a platform from which to pursue social goals through architectural design.

Gump (1974) promoted behaviour settings theory as a useful theoretical lens through which to investigate the role of space in schools, suggesting that:

> Education is an environmental enterprise. Some have thought that it could be advanced by reliance on learning theory or principles from child development,

> but these thoughts arose out of social science's inability to deal with environments. As an environmental enterprise, education requires knowledge about environmental "milieu-with-program" units and concepts. (p. 593)

Gump (1980) and others (e.g. Gislason, 2010) have since used behaviour settings theory to inform their thinking about education as an environmental enterprise.

PAST PRACTICES IN LEARNING ENVIRONMENT EVALUATION

Metrics by which the Performance of School Facilities have been Measured

Prior research across the primary, secondary and tertiary education sectors has revealed a variety of metrics by which the performance of educational facilities can be measured. Over recent decades, these approaches to learning environment evaluation have largely focused on features of the physical environment itself. For example, Sanoff's (2001) School Building Rating Scale tool is organized around the assessment of the following variables:

- Physical features
- Outdoor areas
- Learning environments
- Social areas
- Media access
- Transition spaces and circulation routes
- Visual appearance
- Degree of safety and security
- Overall impression
- Personal information

In contrast, but still with a strong focus on features of the physical environment, the Design Quality Indicators for Schools (DQIfS) tool developed in the UK (CABE, 2005) provides another example of a school evaluation approach organized around physical variables. These include the following:

- Functionality
- Access
- Space
- Uses
- Build quality
- Performance
- Engineering services
- Construction
- Impact

- School in its community
- Within the school
- Form and materials
- Character and innovation

While these measurement variables may be important, both examples omit consideration of the social or human components of the 'learning environment'.

Early Approaches to Building Evaluations

The first systematic building evaluations were conducted during the 1960s by academic researchers with backgrounds in environmental psychology (Cooper, 2001). In keeping with the literature reviewed above, these groups were interested in the interaction of people and their environment and wished to ''make building design more rigorous and systematic'' (Cooper, 2001, p. 159). Some of the earliest evaluations were performed on university dormitories in the USA (Preiser & Nasar, 2008) and on a variety of non-domestic buildings in the UK (Cooper, 2001).

A cessation of such activity followed building evaluations of public works projects and government buildings in the UK, USA, Canada, New Zealand and Australia during the 1980s. This was due to a lack of funding and a perception that the lens of environmental psychology had failed to deliver. According to Preiser and Nasar (2008) – prominent figures in the field of POE and Building Performance Evaluation – there was a perceived disconnect between the process and conduct of evaluations and the use of evaluative findings. However, they noted that academic researchers have recently become interested in building evaluation and begun to develop new perspectives from which to consider such evaluations. They reported that:

> The 21st century has seen a new paradigm replacing the hierarchical, command and control, top-down approach with a consumer-oriented democratic approach, one that is autonomous, self-organizing, ecological, to sustain adaptation and continuous improvement … It calls for fairness, open, two-way communication, community building, cooperation, trust and honesty. For places experienced by the public (building exteriors, and interiors used by many people), the values of the public (the consumer) take priority. (Preiser & Nasar, 2008, pp. 88–89)

With respect to the higher education sector, the conclusions of the *Learning Landscapes in Higher Education* report (CERD, 2010) support this notion. This report concluded that evaluation should move from ''a focus on 'spaces' to 'places' with an emphasis on the social and pedagogic rather than the financial and the material (p. 47).

RENEWED APPROACHES TO THE EVALUATION OF PHYSICAL LEARNING ENVIRONMENTS

Evaluating the Effectiveness of Units of the Environment as Pedagogical Settings: Future Directions for Research and Evaluation

Although building evaluation methods that were informed by theories of environmental psychology may have fallen from grace during the period from the late-1980s to the mid-2000s, it would appear that such frameworks are again in their ascendency. Addressing the missing link between (1) the findings of evaluations that make connections between peoples' lived experiences of units of the environment (i.e. their responses to different behaviour settings) and (2) the use of such findings, appears to be the locus of potential improvement in the way school facilities can be evaluated and understood. Gaining people's confidence in evaluation methodologies and methods that make strong connections between 'pedagogy and space' would appear to be a key step forward.

Given Ornstein, Moreira, Ono, Franca, and Norgueira's (2009) conclusion that ''user-informed assessments increase the likelihood that a given school building fulfils its intended educational purposes to the greatest degree possible'' (p. 364), it would appear logical that if learning environments are to be assessed for the ways they can support desired teaching and learning practices, activities and behaviours, they must be assessed subjectively within the context of the educational model(s) they are intended to support. Approaching school learning environment evaluations in such a way would overcome some well identified gaps in the literature. For example, Pearshouse et al (2009, p. 4) identified ''a need for the educational sector as a whole to reconsider how to evaluate physical learning spaces, so as to more clearly assess how they satisfy design intentions and teaching and learning needs", while Gislason (2010) posited that:

> Few studies of any kind have linked school design with the human interactions that govern learning environments, and none drew substantive conclusions about how the use and configuration of instructional space frame teaching and learning. (p. 128)

Evaluative frameworks aligned with Gislason's (2010) model for school design research[1] would address connections between the physical and social components of units of the environment. Gislason's model highlighted:

- Ecology – building design, technology and other material elements;
- Organization – teaching, scheduling and curriculum;
- Student milieu – learning and motivation, social climate; and
- Staff culture – assumptions, values, and patterns of thought and behaviour.

Evaluating school learning environments through the lens of critical human geography and environmental psychology would not only provide important

information about the design of learning spaces but also critically about how such environments were inhabited and used by teachers and students (i.e. information about the 'programs', 'processes' and 'systems' operating within and in connection to learning spaces). Evaluative findings about the later could aid the development of what Saltmarsh et al. (2014) described as 'spatially responsive pedagogies', which they suggested are underpinned by "commitment to collective learning with, about and within a particular environment" (p. 12). Involving teachers in the processes and outcomes of learning environment evaluations could also assist school leaders to effect a range of pedagogically-oriented changes in their schools. As Hargreaves and Fullan (2012) suggested, leadership for transformative change in teaching involves a mixture of 'push, pull, and nudge' effects. Sponsorship and participation in learning environment evaluations that produce findings linking pedagogical activity with the affordances of units of the environment would not only provide important information about what is working (or not) with respect to the design of learning environments, but also with respect to the pedagogical inhabitation and use of such environments.

CONCLUSION

Based on the ideas discussed above about the value of critical human geography and environmental psychology as lenses for the evaluation of units of the environment in schools, the E21LE project is aiming to provide a range of evaluative strategies and tools that can be utilized by schools and governing agencies to influence *decisions* about (1) what types of learning spaces should be built or refurbished and (2) how school communities can get the most out of the spaces they already have through professional capacity building (*improvement*). Via both strategies, the project hopes to inform the push, pull and nudge factors of pedagogical change.

The following four chapters in the 'Emerging Methods' section of the book explore a range of vital issues associated with the metrics, methodologies and methods of learning environment evaluation.

Graeme Oliver explores the connections between innovation in educational practice and innovation in learning environment design, and explores a variety of issues associated with how best to evaluate the relationships between these social and physical components of the learning environment.

Taking a more positivist and statistical approach to learning environment evaluation, Terry Byers introduces methodologies and methods aimed as evaluating the effect of learning environments on students' motivation, engagement and assessed learning outcomes.

Leanne Rose-Munro highlights the importance of the acoustic performance of learning environments – especially for students with hearing difficulties – and suggests an approach to determining the relative levels of inclusion that learning environments may provide with respect to speaking and listening.

And finally, Ana Sala-Oviedo and Wesley Imms explore important issues associated with how to appropriately frame and conduct learning environment evaluations. Drawing on evaluation theories about what evaluators should do when conducting evaluations, this work aligns with Coryn et al.'s (2011) suggestion that evaluation theory helps to guide people's choices about the purposes of evaluation, users, and uses of evaluate processes and findings.

NOTE

[1] After Owens and Valesky (2007) and by deduction after Barker and Gump (1964).

REFERENCES

Barker, R. (1968). *Ecological psychology*. Stanford, CA: Stanford University Press.

Barker, R. (1976). On the nature of the environment. In H. M. Proshansky, W. H. Ittelson, & L. G. Rivlin (Eds.), *Environmental psychology: People and their physical settings.* New York, NY: Holt, Rinehart and Winston.

Barker, R., & Gump, P. V. (1964). *Big school, small school: High school size and student behaviour*. Stanford, CA: Stanford University Press.

Bechtel, R. B. (1977). *Enclosing behaviour* (Vol. 31). Stroudsburg, PA: Dowden, Hutchison & Ross, Inc.

CABE. (2005). *Picturing school design. A visual guide to secondary school buildings and their surroundings using the design quality indicator for schools*. London: Commission for Architecture and the Built Environment.

Carman, J. G. (2011). Understanding evaluation in nonprofit organizations. *Public Performance & Management Review, 34*(3), 350–377. doi:10.2753/PMR1530-9576340302

CERD. (2010). *Learning Landscapes in Higher Education*. Lincoln: Centre for Educational Research and Development, University of Lincoln.

Chelimsky, E. (2013). Balancing evaluation theory and practice in the real world. *American Journal of Evaluation, 34*(1), 91–98.

Cleveland, B., & Fisher, K. (2014). The evaluation of physical learning environments: A critical review of the literature. *Learning Environments Research*, *17*, 1–28.

Cooper, I. (2001). Post-occupancy evaluation—Where are you? *Building Research & Information*, *29*, 158–163.

Coryn, C. L. S., Noakes, L. A., Westine, C. D., & Schröter, D. C. (2011). A systematic review of theory-driven evaluation practice from 1990 to 2009. *American Journal of Evaluation, 32*(2), 199–226.

Cousins, J. B., Goh, S. C., Clark, S., Lee, L. E. (2004). Integrating evaluative inquiry into the organisational culture: A review and synthesis of the knowledge base. *The Canadian Journal of Program Evaluation, 19*, 99–141.

Davidson, E. J. (2004). *Evaluation methodology basics [electronic resource]: The nuts and bolts of sound evaluation*. Thousand Oaks, CA & London: Sage.

Dovey, K., & Fisher, K. (2014). Designing for adaptation: The school as socio-spatial assemblage. *The Journal of Architecture*, 1–27. Retrieved from http://dx.doi.org/10.1080/13602365.2014.882376

Elliot, F., & Malcolm, B. (2011). The case for a learning space performance rating system. *Journal of Learning Spaces*, *1*(1).

Fisher, K. (2002). *Schools as 'prisons of learning' or, as a 'pedagogy of architectural encounters': A manifesto for a critical psychological spatiality of learning*. Adelaide: Flinders University of South Australia.

Gislason, N. (2010). Architectural design and the learning environment: A framework for school design research. *Learning Environments Research*, *13*(2), 127–145. doi:10.1007/s10984-010-9071-x

Gump, P. (1974). Operating environments in schools of open and traditional design. *The School Review, 82*(4), 575–593.

Gump, P. (1980). The school as a social situation. *Annual Review of Psychology, 31,* 553–582.
Hargreaves, A., & Fullan, M. (2012). *Professional capital: Transforming teaching in every school.* New York, NY: Teachers College Press.
Heft, H. (2001). *Ecological psychology in context*. Mahway, NJ: Lawrence Erlbaum Associates.
Højlund, S. (2014). Evaluation use in the organizational context: Changing focus to improve theory. *Evaluation, 20*(1), 26–43. doi:10.1177/1356389013516053
Johnson, K., Greenseid, L. O., Toal, S. A., King, J. A., Lawrenz, F., & Volkov, B. (2009). Research on evaluation use: A review of the empirical literature from 1986 to 2005. *American Journal of Evaluation, 30*, 377–410.
Lees, L. (2001). Towards a critical geography of architecture: The case of an Ersatz Colosseum. *Ecumene, 8*(1), 51–86.
Lefebvre, H. (1991a). *The production of space*. Oxford: Blackwell.
Lefebvre, H. (1997). The production of space. In N. Leach (Ed.), *Rethinking architecture: A reader in cultural theory*. New York, NY: Routledge. (Original work published 1991)
Merrifield, A. (2000). Henri Lefebvre: A socialist in space. In M. Crang & N. Thrift (Eds.), *Thinking space.* London: Routledge.
OECD. (2013). *Innovative learning environments, centre for educational research and innovation*. Paris: OECD.
Ornstien, S. W., Moreira, N. S., Ono, R., Franca, A. J. G. L., & Nogueira, R. A. M. F. (2009). Improving the quality of school facilities through building performance assessment: Educational reform and school building quality in Sao Pauol, Brazil. *Journal of Educational Administration, 47*, 350–367.
Owens, R. G., & Valesky, T. C. (2007). *Organizational behavior in education: Adaptive leadership and school reform* (9th ed.). Toronto, Canada: Pearson Education, Inc.
Preiser, W. F. E., & Nasar, J. L., (2008). Assessing building performance: Its evolution from post-occupancy evaluation. *Archnet-IJAR: International Journal of Architectural Research*, (1), 84.
Saltmarsh, S., Chapman, A., Campbell, M., & Drew, C. (2014). Putting "structure within the space": spatially un/responsive pedagogic practices in open-plan learning environments. *Educational Review, 67*(3), 315–327. doi:10.1080/00131911.2014.924482
Sanoff, H. (2001). *School building assessment methods*. Washington, DC: National Clearinghouse for Educational Facilities.
Schoggen, P. (1989). *Behavior settings: A revision and extension of Roger G. Barker's ecological psychology.* Stanford, CA: Stanford University Press.
Scott, M. M. (2005). A powerful theory and a paradox: Ecological psychologists after Barker. *Environment and Behaviour, 37*(3), 295–329.
Scriven, M. (1991). *Evaluation thesaurus.* Thousand Oaks, CA: Sage.
Soja, E. W. (1989). *Postmodern geographies: The reassertion of space in critical social theory*. London: Verso.
Weinstein, C. S. (1981). Classroom design as an external condition for learning. *Educational Technology, 21*, 12–19.

Benjamin Cleveland
Melbourne School of Design
The University of Melbourne