

# Where Knowledge Resides: Exploring Architecture of Learning and Knowing from the Community of Practice Perspective

In his 1994 essay, *Truth without Correspondence to Reality*, Richard Rorty writes that “one should stop worrying about whether what one believes is well-grounded and start worrying about whether one has been imaginative enough to think up interesting alternatives to one’s present beliefs” (p. 34). Advocating for theoretical inter-disciplinarity as a catalyst toward new design agency, this paper explores a theoretical model from which contemporary practice can draw principles and apply to the design of certain places. The model contributes to the topic by offering interpretations and insights about the programmatic, physical, and spatial aspects of sites of production in the knowledge economy including work and educational spaces.

## INTRODUCTION

The shifting landscape of learning and knowing<sup>1</sup> calls for revisiting the knowledge economy’s “new sites of production (Madanipour, 2013, p. 153)”. Universities, science and technology parks, research establishments, and workplaces, like most organizations today, are facing complex knowledge challenges due to the changing social, economic, and technological trends: the emphasis on knowledge, creativity, and innovation as the essential elements of thriving societies (Birgeneau, 2005), the collapsing business model of many traditional universities in light of disruptive innovation (Christensen et al., 2011), emergence of new knowledge and learning ecologies forecasting a new culture of learning (Thomas & Brown, 2011), characteristics and traits of the Millennial generation (Rickes, 2009) and their need to acquire new knowledge and skills on an almost continuous basis (Brown & Adler, 2008) as a result of organizations’ greater reliance on intellectual capabilities of skilled labor force of managers and professionals (Wenger et al., 2002; Powell & Snellman, 2004; Madanipour, 2013), are among the main factors involved in the knowledge dilemma of our time.

What should we expect from the *new sites of production* in the new economy then? What does account for the value and the role of place and physical space within a system of consumption and production based on intellectual capital? And more fundamentally, what do these new places look like? Frank Duffy (2008, p. 59) responds to the first two questions by arguing that “in the knowledge economy we will measure places ... by the amount of knowledge that is accumulated and quantity of ideas that are generated within their fabric”. Consequently, he provides a hint for the third one: look for places that support structures within which knowledge is accumulated and generated—after all, “if knowledge is not found everywhere, then where it is located becomes a particularly significant issue (Malecki, 2000, p. 110)”. Yet, in order to examine such places, we will need to have an understanding of those

AMIN MOJTAHEDI

University of Wisconsin-Milwaukee

Basic aspects of practice	Defining concepts	Description
Practice as meaning	<i>Participation</i>	The social experience of living in the world in terms of membership in communities.
	<i>Reification</i>	The process of giving form to experience by producing objects that congeal this experience into thingness.
Practice as community	<i>Mutual engagement</i>	Members' engagement in regular interaction through which they shape the community's practices.
	<i>Joint enterprise</i>	Working towards shared goals and creating shared understanding that binds people and provides cohesion to actions.
	<i>Shared repertoire</i>	Communal resources such as language, routines, sensibilities, artifacts, tools, stories, styles, etc., that the community produces and to which provides access for members.
Practice as learning	<i>Shared history of learning</i>	Produced by the interplay of participation and reification with time and sustained mutual engagement in a joint enterprise. Manifested through shared language, stories, physical objects, and memories.
Practice as boundary	<i>Boundary objects</i>	Artifacts, documents, terms, concepts, and other forms of reification around which CoPs can organize their interconnections.

1

Basic aspects of practice	Defining concepts	Overall structure of pattern
Practice as meaning	<i>Participation</i>	Accommodates multiple levels of participation.
	<i>Reification</i>	Encourages members to transcribe their individual and collective thoughts, ideas, etc. Also, turns sharing and adding to the repository into a playful act through which participants feel proud of their contribution.
Practice as community	<i>Mutual engagement</i>	Is permeable, neutral, and leveler, thus opens up intentional and unanticipated social opportunities. Also provides interstitial conditions that stimulate the probability of collision between social networks.
	<i>Joint enterprise</i>	Is specific to certain core practices.
	<i>Shared repertoire</i>	Adapts to members' routines, sensibilities, styles, and behaviors.
Practice as learning	<i>Shared history of learning</i>	Offers a legible cross-section of the community's history by reflecting glimpses and snapshots of its past rather than showcasing a segment of its present.
Practice as boundary	<i>Boundary objects</i>	Juxtaposes patterns for reification with patterns for mutual engagement.

2

Table 1: Basic aspects of practice

Table 2: Architectural patterns corresponding to aspects of practice

structures which take responsibility for learning and knowledge within and across places.

### COMMUNITY OF PRACTICE (COP)

The community of practice perspective is largely conceptualized and explained by the social learning theorist Étienne Wenger (Lave & Wenger, 1991; Wenger et al., 2002; Wenger, 1998, 2000a, 2000b, 2007, 2009, 2010, 2013). This perspective has its roots in attempts to develop accounts of the social nature of human learning inspired by anthropology and social theory reflected in Lave's cognition in practice (1988), Bourdieu's habitus/field theory (1977), Giddens' structuration theory (1984), Foucaultian concept of power (1980), Vygotsky's zone of proximal development (1978), and Engeström's version of activity theory (1987). Yet, CoP has also been widely referred to as a key component of a knowledge strategy in organizations (Brown & Duguid, 1991; Lesser et al., 2000; Allee, 2000; Wenger et al., 2002; Saint-Onge & Wallace, 2003).

Since the early 1990s, the concept of CoP has been extensively used as a theoretical construct, a practical learning and knowledge strategy, and an effective managerial tool to address issues of individual learning and organizational development across multiple social science disciplines and professional fields (Koliba & Gajda, 2009; Amin & Roberts, 2008; Hughes et al., 2007). Therefore, there have been various interpretations of the concept. In their brief introduction to CoPs, Wenger and Trayner (2015) define the concept and address some of the assertions about it:

Communities of practice are formed by people who engage in a process of collective learning in a shared domain of human endeavor ... the role of CoPs is [not only] to share knowledge ... [but also] to innovate and solve problems (p. 1–6).

At the level of individual, CoP grants different levels of participation to learners and legitimizes persons' positions on the periphery of practice. In other words, it enculturates learners (Brown, Collins, & Duguid, 1989) and encourages them to become insiders by learning to function in the community (Brown & Duguid, 1991). Respectively, it fosters belonging as the source of sharing (Wenger, 2000), and allows members to negotiate their individual and collective identities as the wellspring of creativity (Wenger, 1998, 2000).

At the level of organization, the concept has been mostly used in two contexts of business and education. In business, CoP has been adopted as the living repository for organizational knowledge and under different names: tech club (DaimlerChrysler), thematic group (World Bank), learning community or network (Hewlett Packard), best practice team (Chevron), family group or process improvement community (Xerox), and center of competence (Denning, 2009; Wenger et al., 2002; Corso & Giacobbe, 2005). As a theory that offers an alternative conceptualization about the nature of human learning, the CoP perspective has shown great potential for affecting educational practice—from grounding learning in communities around subject matter to encouraging students' peripheral participation in broader communities beyond school (Wenger & Trayner, 2015).

Practice, in a CoP, captures the kind of learning activity which the community engages in. Accordingly, it is concerned with a variety of resources that get involved in the process. Practice also has a collective quality because it is the reflection or embodiment of people's better and better ways of interacting with, and being in, the world—in relation to the pursuit of the enterprise. Learning, in this case, is an ongoing endeavor to sustain the practice's usefulness and relevance. And this ongoing endeavor best happens in communities devoted to that practice. Table 1 shows basic aspects of practice including main concepts that define those aspects (Wenger, 1998, 2000b; Wenger et al., 2002; Holmes & Meyerhoff, 1999; Meyerhoff, 2006; Julian, 2010).

## ACCOUNTS OF PHYSICALITY AND SPATIALITY

As community members accumulate their collective learning into a shared repository of resources, they involve all kinds of artifacts (Wenger, 1998). Appropriating social and physical spaces in favor of practice is a characteristic of learning *in situ*. CoP is a structure within which “things contribute to solutions every bit as much as minds do (Lemke, 1997, p.2)”. Information and meaning is coded not just in “verbal routines, formulas, and mental operations” but also in “configurations of objects, material constraints, and possible environmental options (Lemke, 1997, p.2)”. Thus, at some level, what maintains a CoP’s sustainable advantage is the constant negotiation between mental operations in the form of social participation and environmental options as a kind of reification. What is reified then will embody the distinctive knowledge of the community and will become a unique resource for further learning (Wenger, 1998, 2000); accordingly, it takes members’ participation to produce, interpret, and use this reification.

This fundamental duality between participation and reification corresponds to transactional theories of place which put emphasis on the reciprocal or bidirectional nature of people-environment relations. Transactional perspective promotes the idea that the meaning of place is socially constructed, serving as the conceptual foundation for place related theories such as place attachment, place identity, place dependence, and place memory. From this view, meaning of place, or place experience, emerges due to the negotiation between reificative and participative aspects. This negotiation manifests itself as individuals “not only respond to environmental conditions but also take steps to influence and restructure their surroundings (Altman & Rogoff, 1987, Russell & Ward, 1982; Saegert, 1987; Stokols, 1988; Wapner, 1987)”.

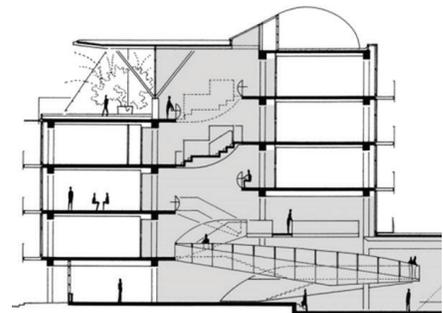
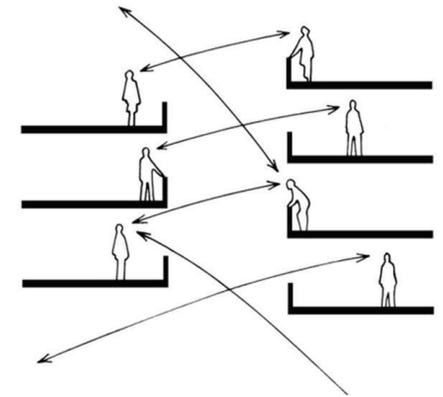
Moreover, being a community member and behaving accordingly has to do with the ways individuals and groups claim space to territorialize (Altman, 1975; Lewis, 1979; Lang, 1987), to exercise power (Foucault, 1995), to regulate social relationships (Bourdieu, 1996), and to appropriate its resources for goal attainment (Stokols & Shumaker, 1981), use environmental meaning to symbolize or situate identity (Cuba & Humonn, 1993), embed social histories and collective memories in things or places (Lewicka, 2008), develop emotional, cognitive, and behavioral bonds with places (Scannell & Gifford, 2011; Giuliani, 2003; Hidalgo & Hernandez, 2001), and follow or enact consensual place rules (Canter, 1991) to orchestrate their social experiences (Berger and Luckmann, 1966) as the life of the community unfolds.

## SIX ARCHITECTURAL PATTERNS<sup>2</sup> BASED ON BASIC ASPECTS OF PRACTICE

In this study, I looked at a group of places through the lens of a certain theory of learning. This helped me to conduct new observations, ask new questions, and offer new interpretations about the physical and spatial aspects of places. I also attempted to capture these new insights in six architectural patterns. It is important to emphasize that these patterns are not statements of truth which could be verified or falsified, but they offer a way of thinking about the social nature of learning and knowing in certain architectural projects<sup>3</sup>.

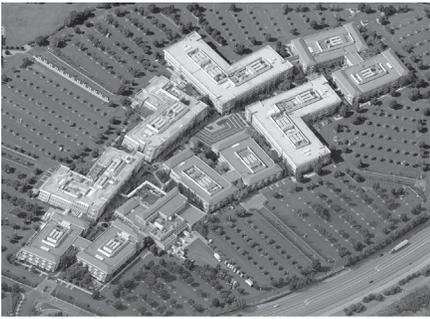
As it was mentioned earlier, a CoP’s practice is concerned with a variety of resources which are involved in the learning process of a group of people. These resources include artifacts, language, narratives, and in many cases, physical and spatial features of the environment. Therefore, Table 1 serves as a foundation for exploring patterns that best capture complexities of these resources. Building on properties of practice discussed in Table 1, Table 2 offers the overall structure of architectural patterns corresponding to concepts that define basic aspects of practice.

The criteria for selecting an architectural project in this study have been based on its degree of resonance with at least one basic aspect of practice and its corresponding pattern both explained in Tables 1 and 2. Therefore, although the majority of examples discussed in this



1

Figure 1: *top* Centraal Beheer; *middle* and *bottom* Montessori College Oost. Images from Hertzberger & de Swaan (2009)



2

Figure 2: Facebook's Silicon Valley headquarters. Images from © Jasper Sanidad (2015)

study might be considered as *well-known* or *successful*, I have been most concerned with what they had to offer in relation to the CoP perspective. Respectively, the following six architectural patterns reflect our attempt to place the theory of CoP in the context of real-world projects. Each pattern, conceptually rooted in a basic aspect of practice, explains physical, spatial, and sometimes technological properties that, in conjunction with proper social conditions, could be supportive of a CoP.

### ONE: A PATTERN FOR THE DUALITY

Earlier in this paper, I discussed the interplay between participation and reification. As Wenger (1998) suggests, they cannot be considered in isolation: they come as pair and form a unity in their duality. Urban settings are often reflective of the negotiation between participation and reification—from the elevated corner window overlooking the alley to anti-loitering spikes on the ledge of a sumptuous real estate, from permeable lively plazas that harbor people of all ages to rich-only fortresses known as suburban shopping malls, all are examples of social geometries reified into physical and spatial configurations of diverse scales.

In the scale of a building, also, emulating patterns of city-life seems to be popular in many successful projects. Some examples include work balconies in Montessori College Oost and Centraal Beheer (Figure 1) both designed by Herman Hertzberger, Federal Center South Building 1202 designed by ZGF Architects, and interconnected work terraces in OMA's proposal for the Berlin's new Media Campus.

The participation-reification duality, as a means of negotiating meaning in the community, also provides a way of talking about the variety and accessibility of many jottable surfaces in some work and learning spaces on which users share thoughts and iterate the practice of the community. Stanford d. school, Institute for Computational and Experimental Research in Mathematics (ICERM) at Brown University designed by the Architecture Research Office (AOR), and KBP West Offices by Jensen Architects/Jensen & Macy Architects are examples of buildings which encourage sharing through transcription on walls, glasses, partitions, and moveable boards.

### TWO: A PATTERN FOR THE MUTUAL ENGAGEMENT

Places can foster mutual engagement by stimulating the probability of collision between social networks and allowing them to penetrate into interstitial sites. It is the extent of leakage and overlap between such networks that creates serendipity (Duffy, 2008). Thus, serendipitous encounters are encouraged by the place's permeability.

Facebook's Silicon Valley headquarters (Figure 2) designed by Gensler is an examples of such architecture. Designers transformed what was once a collection of discrete buildings in an early '90s office park into a dense and dynamic urban environment by providing numerous city-like spaces and programmatic choices. After all, there can be no better image of controlled permeability than a thousand highly varied and infinitely welcoming restaurant and café doors (Duffy, 2008).

Other examples of this pattern are Buro-OS's collaborative cloud and OMA's digital valley both proposals for the Berlin's new Media Campus. The basic idea of the two schemes is an urban-scale fracture at the heart of the building. The fracture gradually dissolves and merges into standardized work spaces arranged along the perimeter in favor of creating flexible, informal, and permeable places for collaboration and interaction.

### THREE: A PATTERN FOR THE JOINT ENTERPRISE

Joint enterprise is what brings people together and guides their learning. Community members share a collective understanding about it and have consensus on a variety of practices that are related to it. Thus, joint enterprise requires places that are customized and optimized

for members' core experiences and behaviors that are the very definition of who they are, what their roles are, and how they are best performed.

Laboratories in the Max Planck Institute for Molecular Cell Biology and Genetics by Heikkinen-Komonen Architects and Henn Architekten are designed to fit what scientists in this facility feel accountable towards: organizing work around theorizing and experimentation. The labs largely lack individual offices or studies and are instead equipped with writing desks positioned near the windows and acoustically separated from the experimental research area by glazed partitions to maintain the visual and spatial continuity. This arrangement is provided to support the constant flux between theory and experiment (Braun & Grömling, 2005).

#### FOUR: A PATTERN FOR THE SHARED REPERTOIRE

Members of a CoP are practitioners. They develop a shared repertoire of resources: experiences, stories, tools, and ways of addressing recurring problems—in short a shared practice. This takes time and sustained interaction (Wenger, 2007). Consequently, the place that accommodates for the shared practice also needs time to learn how to eventually adapt itself to the ways and styles that things are being done in the community. Such an environment should be responsive to members' need for experimenting and tinkering with place over a period of time in order for it to eventually be molded appropriately in the context of relationships with other shared resources.

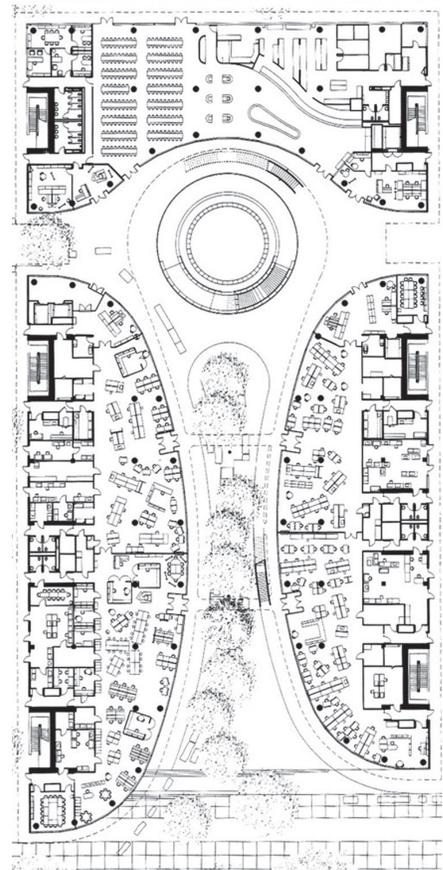
To maximize responsiveness in the interior space of the Stanford University's James H. Clark Center (Figure 3), Foster and Partners decided to replace internal corridors in traditional laboratory facilities with external balconies. This outer zone accommodates circulation areas and provides access to secondary rooms and individual office cells, and thus, minimizes interior circulation paths. This leaves courtyard-facing laboratory spaces largely open and allows members to configure its layout at will. All benches and desks are on wheels and can be moved to allow ad-hoc group formations and to adapt to ever evolving work scenarios. This versatility is further enhanced by workstations that plug into an overhead system of exposed services with flexible connections. Moreover, if required, individual units can be visually and acoustically separated (Foster & Partners, 2003; Braun & Grömling, 2005).

#### FIVE: A PATTERN FOR THE SHARED HISTORY OF LEARNING

CoPs can be thought of as shared histories of learning. History in this sense is a combination of participation and reification intertwined over time (Wenger, 1998). The learning street in the Delft Montessori School (Figure 4) designed by Herman Hertzberger is a manifestation of "the learning space of a community [that] is built through a history of learning together over time (Wenger, 2009, p. 3)". After repeated extensions of the street over almost half a century, this meandering space offers a legible cross-section of the history of the community, and thus has gradually become a repository of snapshots that not only are ready to be negotiated, but also relate members to the community's identity. The building is currently being upgraded, one step at a time (Hertzberger & de Swaan, 2009), through generations of teachers and students' constant participation in a shared practice and within a context that has successfully reified its tradition.

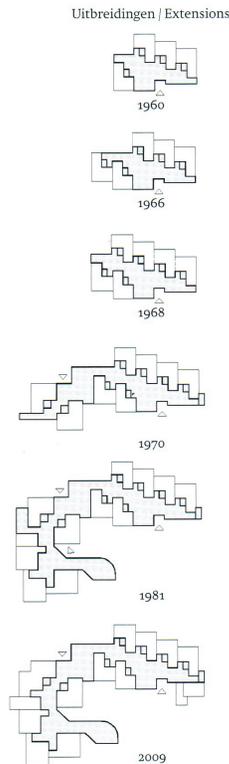
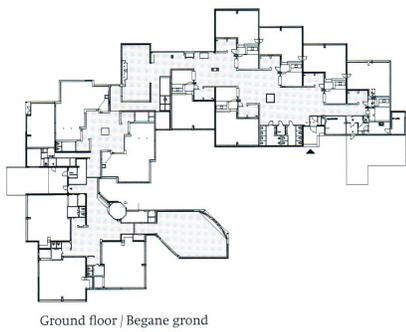
#### SIX: A PATTERN FOR THE BOUNDARY OBJECT

In everyday life we constantly deal with boundary objects that connect us in various ways to CoPs to which we do not belong (Wenger, 1998). Sociologist of science Leigh Star and philosopher of science Griesemer in their 1989 publication write that boundary objects have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation.



3

Figure 3: James H. Clark Center at Stanford University. Images from Foster & Partners (2003) and Braun & Grömling (2005)



4

Figure 4: Delft Montessori School.  
Image from Hertzberger & de Swaan  
(2009)

In his seminal 1980 work, the social life of small urban spaces, the urbanist William H. Whyte discusses a concept with a similar premise: Triangulation. He describes it as a phenomenon in which some external stimulus provides a social bond between people and prompts strangers to talk to each other as though they were not. Similar to the conceptualization of the boundary object, triangulation provides a context for different social worlds to collide. This collision happens in a context impregnated by a world of possible meanings afforded by the triangulator. In other words, both triangulation and boundary object contextualize the social collision.

Kevin Dobbe's interactive installations in Wisconsin Institute for Discovery allow peripheral participants of the scientific community to explore an artifact which brings mathematics, biology, art, and computer science together. The artifact offers the experience of a moment in which the boundary of one realm of knowledge touches another, and thus, attempts to offer the topic of interdisciplinarity as an excuse for social interaction.

## CONCLUSION

One way of understanding the changing architecture of learning and knowing is to examine space and place through the lens of social learning theory. I found CoP perspective useful because it not only provides a way of talking about the shifting landscape, but also offers interpretations and insights about the programmatic, physical, and spatial aspects of sites of production in the knowledge economy including work and educational spaces. This perspective also raises questions and topics regarding the social dynamics of work and learning which, so far, have not received much attention from architectural researchers and practitioners—topics such as: allowing different levels of participation in the practice for community members, the role of triangulators or boundary objects in triggering encounters, patterns of serendipitous interactions and cross-pollinations, the dynamics between social participation and physical-spatial reification, etc.

Similar approaches would naturally question what customary building types have to offer for they seek new paradigms of physical, programmatic, and spatial order. Majority of cases in this study adopted an innovative approach towards programming and design as a result of questioning customary building types' *hidden programs*<sup>4</sup>. Yet, they rendered even more usefulness when investigated through the lens of a social theory about learning and knowing. As Silverstein and Jacobson (1985) once said, the fundamental restructuring of building types is a job that requires, in addition to design skills, a kind of sustained social insight with historical-political dimensions. When it comes to the architecture of learning and knowing in the knowledge economy, community of practice perspective seems to best provide that social insight.

## ENDNOTES

1. *Knowledge lives in the human act of knowing* (Wenger et al., 2002, p. 8).
2. An architectural pattern (Alexander, 1977, 1979) is a system of forces—social, political, economic, and so forth—that results in a recurring spatial relationship (Silverstein & Jacobson, 1985). It is not the aim of the author of a pattern to dictate the solution, but to provoke thinking about each intention (Schneekloth & Shibley, 1995).
3. “Social theory aims to organize a perspective on the world rather than generate statements that can be true or false. This focus on perspective making produces more complex relations between theories, and between theory and practice, than in disciplines where the purpose of theory is to create and debate empirically verifiable statements about the world (Wenger, 2014, p. 1).”
4. “Hidden program is the system of relationships, usually taken for granted, that give the building its basic social-physical form and connect it to the rest of society; and that these relationships, once clarified, can raise questions of such magnitude that they put the very nature of the building in doubt” (Silverstein & Jacobson, 1985, p. 151).

## REFERENCES

- Alexander, C. (1979). *The timeless way of building*. New York: Oxford University Press.
- Alexander, C., Ishikawa, S., Silverstein, M., Jacobson, M., Fiksdahl-King, I. & Angel, S. (1977). *A pattern language: towns, buildings, construction*. New York: Oxford University Press.
- Allee, V. (2000). Knowledge networks and communities of practice. *OD Practitioner*, 32 (4). Retrieved from <http://www.vernaallee.com/images/vaa-knowledgenetworksandcommunitiesofpractice.pdf>
- Altman, I. (1975). *Environment and social behavior: Privacy, personal space, territory, and crowding*. Monterey, CA: Brooks/Cole.
- Altman, I. & Rogoff, B. (1987). Worldviews in psychology. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (Vol. 1, pp. 7–40). Toronto: John Wiley & Sons.
- Berger, P. L. & Luckmann, T. (1966). *The social construction of reality: a treatise in the sociology of knowledge*. NY: Anchor Books.
- Birgeneau, R. (2005). The Role of the University and basic Research in the New Economy. In G. Jones, P. Mccarney & M. Skolnik (Eds.) *Creating Knowledge, Strengthening Nations*. (pp.167–195). Toronto: University of Toronto Press.
- Bourdieu, P. (1977). *Outline of a theory of practice*. Cambridge, UK: Cambridge University Press.
- Bourdieu, P. (1991). *Physischer, sozialer und angeeigneter physischer Raum* (Physical, social and adopted physical space). *Stadt-Räume* (City-Spaces). *Die Zukunft des Städtischen* (The future of the urban). M. Wentz. Frankfurt am Main: 25–34.
- Bourdieu, P. (1996). Vilhelm Aubert memorial lecture: Physical Space, Social Space and Habitus. Oslo, Department of Sociology, University of Oslo & Institute for Social Research.
- Brand, S. (1995). *How buildings learn: what happens after they're built*. New York: Penguin Books.
- Braun, H. & Grömling, D. (2005). *Research and technology buildings*. Berlin: Birkhäuser Architecture.
- Brown, J. S. & Adler, R. P. (2008). Minds on fire: open education, the long tail, and learning 2.0. *Educause Review*, 43, 16–32.
- Brown, J. S., Collins, A. & Duguid, S. (1989). Situated cognition and the culture of learning. *Educational Researcher*. 18(1), 32–42.
- Brown, J. S. & Duguid, P. (1991). Organizational learning and communities of practice: toward a unified view of working, learning, and innovation. *Organization Science*, 40 (3), 40–57.
- Canter, D. (1991). Understanding, assessing and acting in places: Is an integrative framework possible? In T. Garling & G. Evans (Eds.) *Environmental Cognition and Action: An Integrative Multidisciplinary Approach*. New York: Oxford University Press.
- Christensen, C. M., Horn, M. B., Caldera, L., Soares, L. (2011). *Disrupting college: how disruptive innovation can deliver quality and affordability to postsecondary education*. Center for American Progress and Innosight Institute. Retrieved from <http://www.americanprogress.org/issues/labor/report/2011/02/08/9034/disrupting-college/>
- Clark Center, *Stanford University by Foster and Partners*. (2003). Retrieved from <http://www.fosterandpartners.com/projects/clark-center-stanford-university/>
- Cuba, L. & Hummon, D. M. (1993). Constructing a sense of home: place affiliation and migration across the life cycle. *Sociological Forum*, 8, 547–572.
- Dobbe, K. (2010). *Fibonacci Chimes*. Retrieved from [http://kevindobbe.com/kDobbe/Fib\\_Chimes.html](http://kevindobbe.com/kDobbe/Fib_Chimes.html)
- Duffy, F. (2008). *Work and the city*. London: Black Dog Publishing Limited.
- Duncan, J. S. (1973). Landscape taste as a symbol of group identity: a Westchester county village. *Geographical Review*, 63, 334–335.
- Ehmann, S. & Borges, S. (2012). *Learn for life: New architecture for new learning*. Berlin: Gestalten Verlag.
- Foucault, M. (1980). *Power/Knowledge: selected interviews and other writings: 1972–1977*, ed. by C. Gordon. New York: Pantheon.
- Foucault, M. (1984). Space, knowledge, and power. In P. Rabinow (Ed.), *The Foucault reader* (pp. 239–256). London: Penguin.
- Giddens, A. (1984). *The constitution of society: outline of the theory of structuration*. University of California Press.
- Giuliani, M. V. (2003). Theory of attachment and place attachment. In M. Bonnes, T. Lee and M. Bonaiuto (Eds.), *Psychological Theories for Environmental Issues* (pp. 137–171). Aldershot: Ashgate Publishing Limited.
- Heidegger, M. (1971). *Poetry, language, thought*. New York: Harper & Row.
- Hertzberger, H. & de Swaan, A. (2009). *The schools of Herman Hertzberger*. Rotterdam: 010 Publishers.
- Hidalgo, B. & Hernández, B. (2001). Place attachment: conceptual and empirical questions. *Journal of Environmental Psychology*, 21, 273–281.
- Holmes, J. & Meyerhoff, M. (1999). The community of practice: Theories and methodologies in language and gender research. *Language in Society*, 28(2), 173–183.
- Inside Facebook’s Menlo Park Headquarters by Gensler. (2012). Retrieved from <http://officesnapshots.com/2013/02/04/facebook-menlo-park-office-design/>
- Julian, J. (2010). *Facilitating project performance improvement: A practical guide to multi-level learning*. New York: American Management Association.
- Lang, J. (1987). *Creating Architectural Theory: The Role of the Behavioral Sciences in Environmental Design*. New York: Van Nostrand Reinhold.
- Lave, J. (1988). *Cognition in practice: mind, mathematics, and culture in everyday life*. Cambridge: Cambridge University Press.
- Lave, J. & Wenger, E. (1991). *Situated learning: legitimate peripheral participation*. Cambridge: Cambridge University Press.
- Lemke, J. (1997). Cognition, context, and learning: a social semiotic perspective. In D. Kirshner & J. Whitson (Eds.), *Cognition: social, semiotic, and psychological perspectives* (pp. 37–56). Mahwah, NJ: Lawrence Erlbaum Associates.
- Lesser E. L., Fontaine, M. A. & Slusher, J. A. (2000). *Knowledge and communities*. Boston: Butterworth-Heinemann.
- Lewicka, M. (2008). Place attachment, place identity, and place memory: Restoring the forgotten city past. *Journal of Environmental Psychology*, 28, 209–231.
- Lewis, C. A. (1979). Comment: healing in the urban environment. *Journal of the Institute of American Planners*, 45, 330–338.
- Madanipour, A. (2013). *Knowledge Economy and the City: Spaces of Knowledge*. London: Routledge.
- Malecki, E. J. (2000): *Knowledge and Regional Competitiveness*. *Erdkunde*, 54, 334–351.
- Meyer, P. (2010). *From workplace to playspace: Innovating, learning, and changing through dynamic engagement*. San Francisco: Jossey-Bass.
- Meyerhoff, M. (2006). *Introducing Sociolinguistics*. New

- York: Routledge.
- Nyren, R. (2012). Facebook's new faces: Gensler designs Facebook's headquarters. Retrieved from <http://m.interiordesign.net/projects/detail/2043-facebook-new-faces/>
- Oldenburg, R. (1999). *The great good place: Cafés, coffee shops, bookstores, bars, hair salons, and other hangouts at the heart of a community*. New York, NY: Marlowe and Co.
- Oldenburg, R. (2001). *Celebrating the third place: Inspiring stories about the great good places at the heart of our communities*. New York, NY: Marlowe and Co.
- Powel, W. W. & Snellman, K. (2004). The knowledge economy. *Annual Review of Sociology*, 30, 1999–2200.
- Remmers, B. (2011). Office design and knowledge economy. In C. Schittich (Ed.), *In Detail: Work environments: Spatial concepts, Usage Strategies, communications* (pp. 27–34). Munich: Institut für internationale Architektur-Dokumentation GmbH Co.
- Rickes, P. C. (2009). Make way for millennials: how today's students are shaping higher education space. *Planning for Higher Education*, 37(2), 7–17.
- Rorty, R. (1999). *Philosophy and social hope*. London: Penguin Books.
- Russell, J. A. & Ward, L. M. (1982). Environmental psychology. *Annual Review of Psychology*, 33, 651–658.
- Saegert, S. (1987). Environmental psychology and social change. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (pp. 99–128). New York: Wiley.
- Saint-Onge, H. & Wallace, D. (2003). *Leveraging communities of practice for strategic advantage*. New York: Butterworth-Heinemann.
- Scannell, L. & Gifford, R. (2010). Defining place attachment: A tripartite organizing framework. *Journal of Environmental Psychology*, 30, 1-10
- Schneekloth, L. & Shibley, R. (1995). *Placemaking: the design and management of places*. New York: North Pine Press.
- Sennett, R. (2006). The Open City. Urban Age Newspaper Essay, Berlin. Retrieved from [http://www.urban-age.net/0\\_downloads/Berlin\\_Richard\\_Sennett\\_2006-The\\_Open\\_City.pdf](http://www.urban-age.net/0_downloads/Berlin_Richard_Sennett_2006-The_Open_City.pdf)
- Silverstein, M. & Jacobson, M. (1985). Restructuring the hidden program: Toward an architecture for social change. In W. Preiser (Ed.), *Programming the built environment* (pp. 149–164). New York: Van Nostrand-Reinhold.
- Star, L. & Griesemer, J. (1989). Institutional ecology, translations, and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social Studies in Science*, 19, 387–420. William H. Whyte 1980
- Stokols, D. (1988). Transformational processes in people-environment relations. In J. E. McGrath (Ed.), *The social psychology of time* (pp. 233–252) Beverly Hills, CA: Sage.
- Stokols, D. & Shumaker, S. A. (1981). People and places: A transactional view of settings. In J. Harvey (Ed.), *Cognition, social behavior and the environment* (pp. 441–448). Hillsdale, NJ: Erlbaum.
- Sullivan, C. C. & Horwitz-Bennett, B. (2010). High-performance workplaces: Integrating technology and architecture. *Building Design and Construction*, 51(1), 22–26.
- Thomas, D. & Brown, J. S. (2011). *A new culture of learning: cultivating the imagination for a world of constant change*. Kentucky: CreateSpace Independent Publishing Platform.
- Toker, U. (2006). Workspaces for knowledge generation: Facilitating innovation in university research centers. *Journal of Architectural and Planning Research*, 23(3), 181–199.
- Toker, U. & Gray, D. O. (2008). *Innovation spaces: Workspace planning and innovation in US university research centers*. Research Policy, 37(2), 309–329.
- Twigger-Ross, C. L. & Uzzell, D. L. (1996). Place and identity process. *Journal of Environmental Psychology*, 16, 205–220.
- Vygotsky, L. (1978). Interaction between learning and development. In M. Cole (Ed.), *Mind in society: the development of higher psychological processes* (pp. 79–91). Cambridge, MA: Harvard University Press.
- Wapner, S. (1987). A holistic, developmental, systems-oriented environmental psychology: Some beginnings. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (Vol. 2, pp. 1433–1465). New York: Wiley.
- Wenger, E. (1998). *Communities of practice: learning, meaning, and identity*. Cambridge: Cambridge University Press.
- Wenger, E. (2000). Communities of practice and social learning systems. *Organization*, 7 (2), 225–246.
- Wenger, E. (2000). Communities of practice: the key to knowledge strategy. In E. L. Lesser, M. A. Fontaine & J. A. Slusher (Eds.), *Knowledge and communities* (pp. 3–20). New York: Routledge.
- Wenger, E. (2007). *Communities of practice: a brief introduction*. Wenger-Trayner. Retrieved from <http://www.ewenger.com/theory/>
- Wenger, E. (2009) *Social learning capability: four essays on innovation and learning in social systems*. Social Innovation, Sociedade e Trabalho. Booklets 12—separate supplement, MTSS/GEP & EQUAL Portugal, Lisbon.
- Wenger, E. (2010) Communities of practice and social learning systems: the career of a concept. In C. Blackmore (Ed.), *Social Learning Systems and communities of practice*. Springer Verlag and the Open University.
- Wenger, E., McDermott, R. & Snyder, W. M. (2002). *Cultivating communities of practice: a guide to managing knowledge*. Massachusetts: Harvard Business School Press.
- Wenger, E. & Snyder, W. M. (2004). *Communities of practice: the organizational frontier*. In Harvard business review on teams that succeed. Boston: Harvard Business School Publishing Corporation.
- Wenger-Trayner, E. & Wenger-Trayner, B. (2014) Learning in landscapes of practice: a framework. In E. Wenger-Trayner, M. Fenton-O'Creevy, S. Hutchinson, C. Kubiak & B. Wenger-Trayner (Eds.), *Learning in landscapes of practice: boundaries, identity, and knowledgeability in practice-based learning*. New York: Routledge.
- Worpole, K. (2013). *Contemporary library architecture: A planning and design guide*. New York: Routledge.