

A theoretical review and new directions for designing hybrid learning spaces with web2.0 technologies

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Abstract

Learning spaces can have a significant impact on learning. The emergence of virtual space with information technology has transformed the spatial design and organization of the learning spaces. Embodied web2.0 technologies, which empower learners and allow learners' collaboration, sharing, and participation between asynchronous and synchronous, have been increasingly changing the way of learning and extending the learning spaces. In spite, an important piece of restructuring learning spaces with web2.0 is not concerned. The purpose of this study is to conceptualize comprehensive constructs for understanding the learning spaces and explore the learning technologist's roles for designing learning spaces with web2.0 technologies through a hybrid approach. Some suggestions for the learning technologists when they design for hybrid learning spaces with web2.0 are as follows: Utilization of affordance-based design through a hybrid approach; Application of self-directed learning strategies in hybrid learning spaces; Integration of Net gen-based design with content strategies; Focusing of designing space for learning itself.

Key words: learning spaces, hybrid learning space, learning space design, affordance-based design, web2.0 technologies

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I . Introduction

Learning spaces, whether physical or virtual, can have a significant impact on learning (Oblinger, 2006). In recent years, the importance of learning spaces has been popularly discussed with new pedagogical learning paradigms that has been focused on learner-centered, more emphasizing collaborative, self-directed, and informal learning. In this perspective, learning occurs not 'in the space' but 'spaces itself' were regarded as 'the 3rd teacher' or 'change agent' (Cannon Design, VS Furniture, Bruce Mau Design, 2010; Oblinger, 2006).

The emergence of virtual spaces with information technology has transformed the spatial design and organization of the learning spaces. Information technology has brought special functions to learning spaces that facilitate interaction through the use of collaborative tools, video-conferencing, or opening virtual spaces for more experimental, exploratory (Enriquez, 2011). The focus is that using the advance of information technology is not just finding information but applying that information in productive ways to creation and integration.

Especially, embracing the web2.0 technologies empowers learners and allow learners' collaboration, sharing, and participation between asynchronous and synchronous. Furthermore it has been increasingly changing the ways of learning and extending the learning spaces from formal to informal spaces with a hybrid approach. As more attention shifts to informal learning spaces with a hybrid approach, there has been much attention and promotion on redesigning learning spaces (Brown & Lippincott, 2003; JISC InfoNet, 2006; Oblinger, 2006).

In spite, important points of redesigning or restructuring learning spaces with web2.0 technologies in hybrid approach are disregarded. The redesign of learning spaces rarely has been the focus on how learners use such spaces for learning. There is hardly any research that integrates learning spaces designing with web2.0 technologies through a hybrid approach. Thus, in looking into the future of learning spaces, the purpose of this

study is to conceptualize comprehensively constructs for understanding the hybrid learning spaces and suggest that the learning technologists' roles for designing hybrid learning spaces with web2.0 technologies.

II. The concept of hybrid learning spaces with web2.0 technologies

The learning space is generally conceptualized in different ways under different contexts. It is understood as the term of place or environments. In addition, learning spaces itself is conventionally considered as traditional classroom in physical spaces or learning management systems (LMS) in virtual spaces.

A. Learning spaces, places, and environments

Brown (2005) insists that learning space cannot be a used classroom or LMS instead and place or environment instead. While there are several definitions of LMS, the basic description is a software application that centralizes and automates administration, through use of self-service, self-guided services, assemble. It delivers learning content rapidly, personalize content and enable knowledge reuse (Ellis, 2009).

More specific, the distinction of 'space' and 'place' are similar to that between 'house' and 'home' (Wahlstedt, Pekkola, & Niemelä, 2008). That means place is a space with meaning, which can be individually or socially shared such as a sense of place. Shamai (1991) defined that a sense of place is constructed through experiences, interaction with the place and social interaction. The terms of 'environment' denotes the totality of surroundings and conditions (Warger, EduServe, & Dobbin, 2009). That means space becomes environment, inclusive of a broader sense of place in which people and culture are situated.

Hence, Major reasons that focusing on learning spaces rather than places or environments is more manageable, predictable, and easily adaptable to theoretical frameworks for learning. It is

hard to shape unpredictable and individual sense of place, so learning technologist focus on space itself rather than place or environment like an architect. The basic premise is that learning technologist have to consider the mechanism for designing the learning spaces.

B. Extensibility of learning spaces with web2.0 technologies through a hybrid approach

Traditional learning spaces such as the formal spaces of classrooms embody a specific approach to teaching and learning strategies (Thomas, 2010). However, embodied web2.0 technologies facilitate empower of learners and also allow learners' collaboration, sharing, and participation.

O'Reilly (2005) defined web2.0 technologies as a learner - centered platform and transparency as a characteristic of the collaborative web environment. Cormode and Krishnamurthy (2008) also explained that web2.0 technologies are a kind of platform on innovator for learning where learners are as important as the content that they upload and share with others. Greenhow, Robelia, and Hughes (2009) insisted that web2.0 technologies make affordance of interconnections, content creation and interaction so that it might lead to learner's participation, collaboration, and sharing.

According to these characteristics of web2.0 technologies, Oblinger (2006) pointed out that embodied web2.0 technologies have been increasingly changing the ways of learning and extending the learning spaces. Especially, he emphasized the learning space extensibility that "Spaces are themselves agents for change. Changed spaces will change practice". Smith (2008) insists that the physical space will remain at the core of learning spaces, but recognizes that as web 2.0 changes along with the understanding of the way that people learn, these spaces will also need to evolve and change. According to Oblinger (2006), the design of traditional formal spaces need to be replaced with enablement and flexibility associated with 'built pedagogy', as an opening up of possibilities.

In these perspectives, Lopez and Gee (2006) introduced that the new Learning Studios Project at Estrella Mountain Community College, which provided learners with an opportunity to experiment with radical flexibility in learning spaces with web2.0 technologies such as readily available access to wireless laptop computers, data projectors, and numerous projection surfaces. They intended to "technology is everywhere, but not in the way" which means the seamless integration of technology with three design principles, leveraging physical space, engaging stockholders, and employing radical flexibility, in the Learning Studios. It leads to increased engagement, lowered barriers to participation, flexibility, and support of self-directed learning.

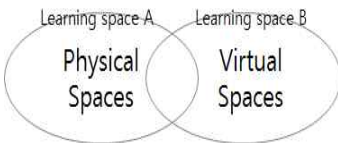
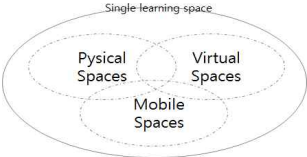
Thus, embodied web2.0 in learning spaces is to accelerate the transition from formal spaces to informal spaces, integrate the physical and virtual spaces through a hybrid approach, and access the regardless synchronous or asynchronous (Brown & Lippincott, 2003). Hunley & Schaller (2006) explained the differences between formal learning spaces and informal learning spaces with respect to structure and content. More concretely, the structure of formal learning space can be facilitated by learning technologist and the content of formal learning space can be described as program-directed. In contrast, the structure and the content of informal learning space can be characterized as self-directed. Hence, web2.0 technologies bring about the extensibility in learning spaces, which contain no boundaries.

Although several studies have been conducted on the conceptualization of learning spaces as a dichotomy between physical spaces and virtual spaces, few studies address the extensibility in learning spaces with non boundaries (Brown, 2005; Oblinger, 2006; Oblinger & Oblinger, 2005). Since the advanced web2.0 technologies supported the mobile or ubiquitous spaces, it emphasized the hybrid approach that more than two spaces are chemically mixed as a larger learning space, while the blending approach that only two spaces are fused as one learning space (refer to Table 1).

More specific, physical and virtual space exist separately in

blended learning spaces such as 'virtual reality' in educational context. While physical, virtual, and mobile space exist seamless in hybrid learning space. Until now, it's really hard to find the concrete example of hybrid learning spaces, but it can be explained the 'advanced augmented reality' using advanced web2.0 technologies in educational context. Learners can create their own semantic learning spaces wherever and whenever through a hybrid approach.

Table 1. Learning spaces through blended approaches and hybrid approaches

	Blended learning spaces	Hybrid learning spaces
Environmental approach	<ul style="list-style-type: none"> • Formal learning spaces • Blended approach 	<ul style="list-style-type: none"> • Informal learning spaces • Hybrid approach 
Structure	• Facilitated	• Self-directed
Content	• Program-directed	• Learner-generated

Therefore, the concept of learning spaces with web2.0 technologies have to be discussed the extensibility in hybrid approach. It means that each learning spaces such as physical, virtual or mobile are not separated but reciprocal, the influence being single in hybrid learning. The hybrid learning space carried by advanced web2.0 generated the Net-generation or the seamless learners, in which could function as a "learning hub" (Looi et al., 2009).

III. The conceptual framework of designing hybrid learning spaces with web2.0 technologies

Designing learning spaces, especially through a hybrid approach with web2.0 technologies mediated, might be

considered basic theoretical frameworks, which are psychological foundations about affordance or new frontier like pedagogical learning paradigms. It shows the conceptual framework of designing the hybrid learning spaces with web2.0 technologies (refer to Fig. 1).

For a better understanding of the conceptual framework, it is necessary to overview the theoretical frameworks and characteristics of embodied web2.0 technologies in hybrid approach.

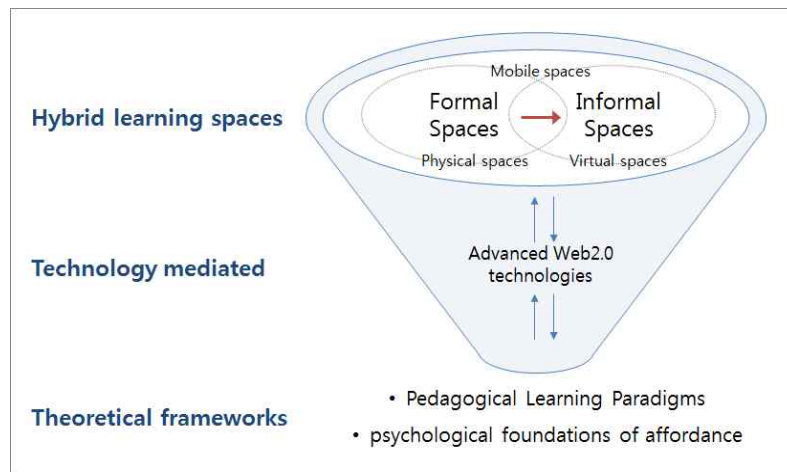


Figure 1. The conceptual framework for designing the learning spaces with web2.0 technologies through a hybrid approach

Theoretical frameworks of embodied web2.0 in learning spaces can be drawn from the foundations of new pedagogical learning paradigms and psychological foundations of affordance.

First, new pedagogical learning paradigms generally insists that learner-centered, more active, self-directed, interactive, and attention shifts to informal spaces. Skill and Young (2002) explained that learning is happening away from the classroom and the demand for more informal spaces for learners will grow along with it. Chism and Brickford (2002) suggested that new pedagogical learning paradigms in learning space design from old to new assumptions (refer to Table 2).

Table 2. From the old to the new in learning paradigm (Skill & Yong, 2002)

Old assumption	New assumption
• learning only happens in classrooms	• learning happens everywhere
• learning happens at fixed times	• learning happens any time
• learning is an individual activity	• learning is very much influenced by the social environment
• what happens in classrooms is pretty much the same from class to class and day to day	• differences in course goals and teaching methods from day to day and course to course require different spaces
• a classroom always has a front	• classroom configuration depends on activity
• learning demands privacy and removal of distractions	• learning is aided by openness and stimuli
• windows distract students from learning	• windows provide needed light and sense of openness
• students can learn from teacher	• students can and should learn from each other; the planning of learning spaces requires true collaboration among multiple actors involved

Furthermore, embodied web2.0 in learning spaces can emphasize the collaborative and self-directed. It requires a considerable degree of 'self-direction in learning'. 'Self-direction in learning' is the capability of one's abilities and skills to process information effectively, and includes interaction with learning environments (Brokett & Hiemstra, 1991; Lee, 2011). According to Lee (2011) the components and the structure of 'self-direction in learning' is to take on important roles not only for learner's self-direction but also learning environments.

Thus, embodied web2.0 in learning spaces supports that the most appropriate tool to mediate learner's activities, the opportunity to create personally driven learning spaces, and the chance to collaborate with others for sharing, without distinction

of specific learning spaces (Long & Ehrmann, 2005). It is important to make learning spaces be available on a flexible and adaptable basis. Also a prime consideration in learning space design must be the facilitation of interaction, stimulating activity, creating learning space for experiment out of sequence.

Second, an affordance is the reciprocity of the organism and the environment (Gibson 1966). In other words, affordance means a kind of interrelationships in which learner's perception guides his or her action and learner's action is to make personal perceptions recognize. The potential of web2.0 technologies to initiate and lead educational transformation is considerable, but very few of the current crops of web2.0 technologies started redesign as educational tools (O'Reilly, 2005).

McLaughlin and Lee (2007) pointed out the affordances of such technologies are not predefined by their particular functionality. That means the specific design and functionality of web2.0 technologies does not define its pedagogical usefulness. They identify four categories of affordance associated with web2.0 technologies as follows: Connectivity and social rapport, collaborative information discovery and sharing, content creation, knowledge and information aggregation and content modification. It is important to understand and recognize the relationships between affordance and learning spaces design.

IV. The roles of learning technologists for designing the hybrid learning spaces with web2.0 technologies

Many researchers suggest some steps or principles for designing the learning spaces. For promoting the effective learning, JISC InfoNet (2006) suggests seven principles for designing the learning spaces as follows. Learning spaces need to be (1) flexible, to accommodate both current and evolving pedagogy, (2) future-proof, to enable space to be reallocated and reconfigured, (3) bold, to look beyond tried and tested technologies and pedagogy (4) creative, to energize and inspire

learners and tutors, (5) supportive, to develop the potential of all learners and (6) enterprising, to make each space capable of supporting different purposes.

The Scottish Funding Council (2006) provides twelve key steps for creating and maintaining effective learning spaces such as group teaching and learning spaces, simulated environments, immersive environments, peer-to-peer and social learning spaces, learning clusters, individual and external spaces.

However, these studies mentioned above did not focus on the extensibility in learning spaces with web2.0 technologies, especially in hybrid approach. Thus, raising these questions. What are the roles of learning technologists for designing the hybrid learning spaces with web2.0? How can we suggest a design for the hybrid learning spaces with web2.0 technologies mediated, considering the basic theoretical frameworks which are psychological foundations about affordance or new frontier like pedagogical learning paradigms? Here are some suggestions for the learning technologists when they design for the hybrid learning spaces with web2.0 technologies.

A. Utilization of affordance-based design through a hybrid approach

Maier and Fadel (2009) suggest the definition of 'affordance-based design'. They explained "Definition of design is the specification of a system structure that does possess certain desired affordances in order to support certain desired behaviors, but does not possess certain undesired affordances in order to avoid certain undesired behaviors."

Using this definition, it is important for learning technologists in hybrid approaches to understand and remember that the emphasis is not on the technology. Receiving teaching, coaching, information, and other models, are not equivalent to learning. The key is that learning technologists seek to provide an effective combination of delivery modes, teaching and learning strategies, expert guidance for convergence between physical, virtual and mobile spaces by technology mediated

learning spaces which is concerned the affordance-based design.

B. Application of self-directed learning strategies in hybrid learning spaces

Since embodied web2.0 in learning spaces generally emphasizes the collaborative and self-directed with 'self-direction in learning', it is important for learning technologists to consider self-directed learning strategies for designing the hybrid learning spaces.

Pata and Laanpere (2011) suggested some strategies for supporting self-directed learning in hybrid learning spaces. First, to define the learning and teaching for learners by collecting their affordance perceptions of their learning spaces dynamically in the course of action. Second, to support the conscious self-managed development of learner-determined spaces, to provide students with the tools of visualizing, to monitor their activity-patterns and learning landscapes, and to enhance public self-reflection and collaborative grounding of learning affordance. Third, to maintain coherence of the current niche, introduce cycles of re-evaluation of learning affordance of the learning spaces. Fourth, to try to influence the niche reemergence by embedding activity traces and ecological knowledge relevant to evoke affordance for certain niches or select activity systems where these traces are naturally present. Fifth, to use same social learning environments repeatedly to gain from feedback left as activity traces and embodied knowledge of earlier learners.

Thus, the key learning technologists concern encouraged greater participation in group activities and gave learners ready access to the hybrid learning spaces with web 2.0 technologies to fulfill their own quests for more information creation.

C. Integration of Net gen-based design with content strategies

Net generation has the differential characteristics such as interactive, experimental, multitask, and group activity-oriented,

etc. As Oblinger (2006), Oblinger and Oblinger (2005), and Brown (2005) identified them as "those outside the classrooms" which are expected seamless technology use. Brown (2005) suggested that the learning spaces should be designed for considering Net gen traits (refer to Table 3).

Table 3. Aligning Net Gen Characteristics, Learning Principles, Learning Space, and IT Applications (Brown, 2005)

Net Gen trait	Learning theory principles	Learning space application	IT application
• group activity oriented	• collaborative, cooperative, supportive	• small-group work spaces	• IM chat; virtual white boards; screen sharing
• goal and achievement oriented	• meta-cognition ; formative assessment	• access to tutors, consultants and faculty in the learning space	• online formative quizzes; e-portfolios
• multitaskers	• active	• tavle space for a variety of tools	• wireless
• experimental; trial and error learners	• multiple learning paths	• integrated lab facilities	• applications for analysis and research
• heavily reliant on network access	• multiple learning resources	• it highly integrated into all aspects of learning spaces	• IT infrastructure that fully supports learning space functions
• pragmatic and inductive	• encouraging of discovery	• availability of labs, equipment, and access to primary resources	• availability of analysis and presentation applications
• ethnically diverse	• engagement of preconceptions	• accessible facilities	• accessible online resources
• visual	• environmental factors; importance of culture and group aspects of learners	• shared screens; availability of printing	• image databases; media editing programs
• interactive	• compelling and challenging material	• workgroup facilitation; access to experts	• variety of resources; no one size fits all

It is really important to integrate the content strategies for embodied web2.0 in hybrid approach. Generally, content includes the text, graphics, video, and audio that make up an interactive experience (Halvorson, 2009). In hybrid learning spaces, content means not only program-directed but also learner-generated or self-directed learning spaces itself. Content strategies as using "the practice of planning for content creation, delivery, and governance that supports meaningful, interactive experiences" (Halvorson, 2009). Thus, the hybrid learning spaces has to be designed so the content strategies make it possible for integrative usage of multiple learning spaces.

D. Focusing of designing space for 'learning' itself

As the previous mentioned, learning occurs not 'in the space' but 'spaces itself' were regarded as 'the 3rd teacher' or 'change agent' (Cannon Design, VS Furniture, Bruce Mau Design, 2010; Oblinger, 2006). However, an important point of considering pedagogical learning paradigms for designing the learning spaces is not concerned (Bahovec, 2009; Walden, 2009). It is very important that learning technologists perceive the importance of designing space for learning itself.

For this perception, Thomas (2010) suggested three requirements that complex learning space design has to be a re-engineering of the design process, to stem from the first, and to relate to the kinds of skills envisaged for the workforce of the future.

V. Conclusion and Implications

This study is a kind of exploratory research on the roles of learning technologists for designing the hybrid learning spaces with web2.0 technologies. The purpose of this study is to conceptualize comprehensive constructs for understanding the learning spaces and explore the learning technologist's roles for designing the hybrid learning spaces with web2.0. Some

suggestions for the learning technologists when they design for hybrid learning spaces with web2.0 are as follows. Utilization for affordance-based design through a hybrid approach; Application of self-directed learning strategies in hybrid learning spaces; Integration of Net gen-based design with content strategies; and Focusing of designing space for learning itself.

The results of this study will give some implications for learning technologists to design the hybrid learning spaces with respect to the following critical points. (1) The characteristics of an effective learning space in hybrid approach with web2.0 can be identified. (2) It can find out tools and platforms of a learning space in hybrid approach with web2.0. (3) It can contrive the instructional processes and the assessment techniques that can be used in the learning space. (4) It can be understood how to interact with the formal and informal space. (5) What the importance of the interactions between formal and informal learning spaces is. If and these critical points are solved it's design could be the expandable, flexible, and adaptable learning spaces for learners to learn more effectively and efficiently.

Received in 30th September, 2011

Reviewed in 12th December, 2011

Revised version received in 19th December, 2011

References

- Bahovec, E. D. (2009). The touch of class: Philosophy, architecture, schooling. *Paper presented at International Conference on Sustainable school buildings: From concept to reality*. Ljubljana, Slovenia, October 1-2, 2009.
- Brown, M. (2005). Learning spaces. In Oblinger, D. G., & Oblinger, J. L.(eds.) *Educating the Net Generation*. Boulder, Colorado: EDUCAUSE.
- Brown, M. & Lippincott, J. (2003). Learning spaces: more than meets the eye. *EDUCAUSE QUARTERLY*, 2003-1, 14-16.
- Brokett, R. G., & Hiemstra, R. (1991). *Self-direction in adult learning: perspectives on theory research and practice*. NY: Routledge.
- Cannon Design, VS Furniture, & Brucau Design. (2010). *The Third Teacher: 79 Ways You Can Use Design to Transform Teaching & Learning (1st Ed)*. New York: Abrams.
- Chism, N. V. N. & Bickford, D. J. (2002). Improving the environment for learning: an expanded agenda. In Chism, N. V. N. & Bickford, D. J. (eds.). *The importance of physical space in creating supportive learning environments*. San Francisco, CA: JOSSEY-BASS.
- Cormode, G. & Krishnamurthy, B. (2008). Key differences between web1.0 and web2.0. *First Monday*, 13(6), Jun 2008.
- Ellis, R. K. (2009). Field guide to Learning Management Systems. *ASTD's Source for E-Learning 2009*. Learning Circuits.
- Enriquez, J. G. (2011). Studying2.0: study habits, places and tools of university students. *Proceeding on the Computer Assisted Learning 2011*. Manchester, UK, 13-15 April, 2011.
- Gibson, J. J. (1966). *The Senses Considered as Perceptual Systems*. Boston: Houghton-Mifflin.
- Greenhow, C., Robelia, B., & Hughes, J. (2009). Web2.0 and classroom research: what path should we take now? *Educational Research*, 38(4), 246-259.
- Halvorson, K. (2009). *Content strategy for the web*. Berkeley: New Riders.
- Hunley, S. & Schaller, M. (2006). Assessing learning spaces. In

- Oblinger, D. G. (eds.) *Learning spaces*. Denver, Colorado: EDUCAUSE.
- JISC InfoNet. (2006). *Designing spaces for effective learning*. UK: HEFCE.
- Lee, S. H. (2011). *The structure analysis of factors affecting on self-directed learning on web-based distance education*. Unpublished thesis for the master degree. Seoul National University.
- Long, P. D., & Ehrmann, S. C. (2005). *Future of the learning space: breaking out of the box*. *EDUCAUSE Review* July-August 2005, 42-58.
- Looi, C.-K., Wong, L.-H., So, H.-J., Seow, P., Toh, Y., Chen, W., et al. (2009). Anatomy of a mobilized lesson: learning my way. *Computers & Education*, 53(4), 1120 - 1132.
- Lopez, H. & Gee, L. (2006). Learning studios project: Estrella Mountain Community College. In Oblinger, D. G. (eds.) *Learning spaces*. Denver, Colorado: EDUCAUSE.
- Maier, J. R. A., & Fadel, G. M. (2009). Affordance based design: a relational theory for design. *Res Eng Design*, 20, 13-27.
- McLoughlin, C., & Lee, M. (2007). Social software and participatory learning: pedagogical choices with technology affordances in the web2.0. *Proceedings in ICT: Providing choices for learners and learning 2007*, Singapore.
- Oblinger, D. G. (2006). Spaces as a change agent. In Oblinger, D. G. (eds.) *Learning spaces*. Denver, Colorado: EDUCAUSE.
- Oblinger, D. G., & Oblinger, J. L. (2005) *Educating the Net Generation*. Boulder, Colorado: EDUCAUSE.
- O'Reilly, T. (2005). *What is Web 2.0? Design patterns and business models for the next generation of software*. Available at <http://www.oreilynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html>
- Pata, K. & Laanpere, M. (2011). An Ecological Meta-Design framework for open learning ecosystems, *Unpublished paper in ECER' 2011*, Berlin, Germany, 13-16, September, 2011.
- Scottish Funding Council. (2006). *Spaces for Learning: a review of learning spaces in further and higher education*. Available at <http://www.jiscinfonet.ac.uk/Resources/external-resources/s>

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- Shamai, S. (1991). Sense of place: an empirical measurement. *Geoforum*, 22(3), 347-358.
- Skill, T. D., & Young, B. A. (2002). Embracing the hybrid model: working at the intersections of virtual and physical learning spaces. In Chism, N. & Brckford, D. (eds). *The importance of physical space in creating supportive learning environments*. San Francisco, CA: JOSSEY-BASS.
- Smith, R. (2008). Technology-Rich Physical Space Design: An overview of JISC Activities. Available at <http://www.jisc.ac.uk/publications/publications/bpelearnspacesv1.aspx>
- Thomas, H. (2010). Learning spaces, learning environments and the dis'placement' of learning. *British Journal of Educational Technology*, 41(3), 502-511.
- Warger, T,, EduServe, & Dobbin, G. (2009). Learning Environments: Where Space, Technology, and Culture Converge. *EDUCAUSE ELI Paper 1*, October 2009.
- Wahlstedt, A., Pekkola, S., & Niemelä, M. (2008). From e-learning space to e-learning place. *British Journal of Educational Technology*, 39(6), 1020-1030.
- Walden R. (2009). *Schools for the future: Design proposals from architectural psychology*. Cambridge, MA: Hogrefe & Huber Publishers.

