I, Joshua P Walker, hereby submit this original work as part of the requirements for the degree of Master of Architecture in Architecture.

It is entitled:
Design, Learn, Repeat: Architecture to Promote Learning Organization Behavior

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Design, Learn, Repeat:
Architecture to Promote Learning Organization Behavior

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Abstract

Since the 1990 publication of *The Fifth Discipline* by Peter Senge, Learning Organization theory has informed countless managers on how to develop and structure competitive advantage through continual, systemic learning. However, a growing number of change managers are recognizing the role of the physical environment in shaping both individual and organizational behavior. This thesis proposes a system for identifying the characteristics of space desirable for each discipline of Senge’s Learning Organization theory, as well as for a sixth discipline—Empowering Leadership—which addresses key criticisms of Senge’s model. These twelve environmental variables are then employed in the design of an incubator facility for design-focused startups in the Clifton Neighborhood of Cincinnati, Ohio. The design focuses on optimizing space for each discipline within a unified palate and familiar typology of spaces in order to promote each discipline both independently and systemically. Ultimately, the final design is conceptualized not as a perfect solution, optimized without respect to its environment, but as an example of these design values employed in a real-world scenario.

Future research may elect to revise the individual values associated with each space—thus revising the expressions leading to the final result—or simply to revise the expression of these values in the physical environment. Ultimately, the expectation is that by providing space for each discipline in turn, the physical environment can support the total learning needs of young organizations and better support their learning and long-term success.
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-Joshua P. Walker
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Learn, Design, Repeat: The Learning Workplace

Introduction

Architecture has long respected the realm of the workplace environment as one of the two primary facilities in which human beings spend the majority of their time. While many architects seek to identify and design the “third place” of modern society, it is also of benefit to reflect on the workplace and question what benefit we might generate from thoughtful redesign of the office- the predominant model for the foreseeable future of work. The design of office environments is often undertaken as an expression of organizational culture, which research suggests has no impact on organizational satisfaction or effectiveness.\(^1\) While trends like active stations (or dynamic work-sharing) may investigate how to optimize use of space in the sense of personnel/floor area, these do little to question the underlying assumptions of how we design for maximum organizational performance... specifically, how design can facilitate organizational development and managerial strategy for long-term success.

Informed by my prior education in Business Administration and Leadership Education, Theory, and Practice, my design research seeks to take a prominent model of management theory- Learning Organization Theory- and express it in the physical environment, with all considerations of contemporary office building requirements and in anticipation of foreseeable workplace design trends. This project seeks to reconcile workplace design with organizational management theory to answer the question: “how can we facilitate the generation of sustainable competitive advantage through the design of the workplace?” To do so, we will analyze the history, current status, and trends of contemporary office design, the emergence and development of Learning Organization theory, and the emergent ideology of integrated workplace design.

\(^1\) Vilnai-Yavetz, Iris, Anat Rafaeli, and Caryn Schneider Yaacov, Instrumentality, 547.
From these studies, we will develop a series of key environmental variables for workplaces and their optimal conditions to facilitate Learning Organization disciplines. These variables will serve as the guide for developing the architectural program- identifying the characteristics of an ideal learning organization- and then as guidelines for the design of the building. The final result is intended as a workplace environment which promotes engagement with all aspects of Learning Organization behavior without detracting or distracting from necessary workplace performance.
A Brief History of Office Design

To investigate the ability of the physical environment to affect workplace behavior, we ought to understand the history behind the modern office and how various forces (especially managerial) have shaped it. An overview— in timeline form— is available in Appendix I, with more detailed discussion below.

In 1904, a German-American man named Frederich Taylor is credited with having the first designed office plan: one based on a factory floor. Taylor’s design attempted to replicate the efficiency of modern manufacturing, and featured a large open plan for employees with supervisor’s offices surrounding and above at mezzanine level for easy supervision.² Offices with large numbers of lower-level workers tended to follow this model, while mid-level managers or fairly senior offices favored individual, walled work environments. This began to change with the European cultural shift of the 1950s, as the German design firm Quickborner developed the Bürolandschaft— “office landscape”— model. Bürolandschaft broke desk rows into clustered groupings and moved many managers out of suites into the main workspace as a shift towards a more democratic, social philosophy.³ The American innovation would come in 1964, when Herman Miller debuted “Action Office,” a largely humanizing system of components meant to encourage motion and elegance of work space.⁴ Action office received critical review in design communities, but fared poorly in the market for being too expensive and at odds with management theory at the time, which emphasized efficiency, control, and economy in the face of a rapidly expanding workforce. Action Office II, released in 1968, catered to this demand by being cheaper, more rigid, and condensing the space allocated per person. Action Office II and the subsequent series of imitation/competing products became known as the “cubicle.”²

By the 1980’s, “cubicle farms” dominated the office landscape. The booming ranks of middle-managers in corporate America had driven cubicles into ubiquity in all but a few professions that clung to the private-office-plus-open-plan Frederich Taylor would recognize. Architecture firms, for example, never truly adopted the cubicle because it would not accommodate the primary work surface of the designer, the drafting table. Regardless, Personal Computing was defining the office, and the stationary, space-efficient computer largely enabled offices to define their workstations with a cubicle, a chair, and a screen.

The next major disruptor in the office environment was technology. Perhaps recognizing the dissatisfaction of their workforce and the incongruence of the highly partitioned environment to emergent sensitivities like Europe’s 1980’s trend towards requiring window views at all workstations, American offices started experimenting with reconsidering the “landscape” ideologies of the Quickborner designs. While American sensitivities tended to restructure the organic European arrangements into rows, grids, or at least structured linear pods, they did begin to slowly reduce the levels of visual separation and approach an “open plan” once again. The media attention around this trend peaked in 1994, with the Frank Gehry-designed New York office of the advertising agency Chiat/Day. The approach was held up as a grand experiment in the “Virtual Office:” there were no assigned desks (employees were effectively required to change desks every day), the “fixed location” challenge of desktops and telephones was resolved by having employees check out Powerbook PCs and Radio Telephones each morning, and the office was even encouraged to go “paperless” to maximize efficiency and mobility. Ultimately, the Chiat/Day experiment was a failure. The management-imposed workstyle proved incompatible with employee’s needs and behaviors and the company almost immediately outgrew its supply of technology- leaving some of its employees without necessary

5 Daryanani and Lull, “Open Office Planning,” 75
computers every day. One of the biggest complaints was that the mobile workforce meant to encourage team grouping actually made it difficult to find and connect with individuals in a multi-floor office as individual’s schedules were virtually impossible to coordinate.

Chiat/Day moved to another office after only a few years, but the ideas promoted in this new, radical office became the foundation of the trend which would define the next two decades of office design. Prominent tech companies like Google, steeped in cultures of “innovation” and informality went on to champion new offices full of bright colors and coffee bars, couches and “huddle spaces.” These new offices intentionally discarded the partitions between desks to encourage collaboration and flexibility and by the 1990s the rest of the world was racing to follow suit. Even LEED (Leadership in Energy and Environmental Design, the United State’s most prominent sustainability rating system for architecture) incentivizes open office plans by providing credit for daylighting 75% of workstations in new office space construction.

Since the new millennium, research has primarily focused on concerns of health, culture, and to some extent privacy as prominent start-ups and tech companies lead the collective consciousness of workplace designers towards inspiring creativity, workplace as recreation and socialization, and research has unveiled the health concerns associated with prolonged periods of sitting. Modern furniture catalogs feature such examples as the adjustable height desk for sitting and standing, trendy treadmill desks and high-design “buoy” chairs by Steelcase (a high-design response to the ill-fated “medicine ball chair” trend). As the open office has proliferated, however, more employers are recognizing the need to facilitate periods of focused, individual productivity where workers can be isolated from the background distractions of the open plan. This has led to such featured pieces as the Steelcase Brody Worklounge

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Modern technology and shifting workplace behaviors (especially of millennials) have also given new enthusiasm to the “Active Workstation” concepts that failed at Chiat/Day, as certain mobile workforces respond well to flexible time/work environments.

The irony of our office environment design is that so much appears to be reactionary, rather than research-based. The original Frederich Taylor plan was a reaction to the efficiency of the factory, the cubicle farms were a reaction to the expanding class of middle-managers needing quick, efficient space. Finally, the “new” open office plan appears to be a counter-reaction to the cubicle farms as the nature of the work changed from mid-level routine to higher-order creative.

This fluctuating relationship with privacy, however, has unveiled the consequences of allowing reactive forces to drive design. As early as 1978, Steelcase research identified “privacy related considerations” such as noise and focus as the top needs of office workers. As the public shifted their attentions to collaboration in the nineties, research like the 1980 study revealing that there was no correlation between physical accessibility and social interaction went unheeded as the culture of “openness” demanded more open environments. What that same research also revealed was that while increasing the degree of accessibility between colleagues did not produce more meaningful conversation, decreasing architectural privacy did correlate to a reduced psychological privacy. Moreover, studies done during the height of the open-office trend (1997 and 2002) revealed that workplace change from highly partitioned to open plan produced no significant change in employee satisfaction, produced overwhelming dissatisfaction with noise levels despite noise being an early consideration in the design process, and that the negative effects incurred by open offices (including

decreased team member relations and perceived job performance and increased physical stress) did not abate over time.\textsuperscript{12}

The relationship between design considerations and workplace experience is perhaps best summarized by a 2005 study in which office design is categorized to one of three concerns: Instrumentality, Aesthetics, and Symbolism\textsuperscript{1}. Researchers studied the impact of emphasis on each of the three variables in the physical environment on participants’ ratings of their satisfaction with and effectiveness in the office. Researchers found high correlation between Instrumentality and both employee Satisfaction and employee Effectiveness, while Aesthetics appeared to correlate highly with Satisfaction, but not Effectiveness. Aesthetics also required a base level of Instrumentality, however, before forming a positive correlation with satisfaction. Furthermore, Symbolic design in the environment (the kind which is thought to influence culture) was not determined to significantly affect individual Satisfaction or Effectiveness. It is this final point which forms the premise for a new design approach.

If design is to facilitate more than just an attempt at expressing culture, if it is to facilitate employee satisfaction and effectiveness- or to generate desirable characteristics and behaviors in individuals which compound into organizational effectiveness and competitive advantage in the long term- then clearly design cannot rest on symbolism alone. In a competitive marketplace, the physical environment is a high-potential asset, one which unless carefully considered will continue to oscillate between trends with no real performative benefit. The question is, how do we inform office design to transcend current paradigms for maximum benefit?
Management + Design: The Case for a New Design Focus

This objective - facilitating organizational success through design - is ultimately (and appropriately) an institutional mission. The design of the environment reflects the mission of the inhabitants, therefore office design seeking to enhance organizational performance is appropriate because the inherent objective of any office-occupying business is to perform as an organization in such a way as to continue existing and generate more opportunities to advance their objectives. That is to say, organizations (including businesses) exist to perform to the best of their abilities and continue to do so in perpetuity. Thus, an office which exists to facilitate optimal performance and continued existence is as appropriate as a school designed to maximize learning opportunity for children.

However, many offices are not designed with such performative objective in mind. In 1984, John Seiler wrote for the Harvard Business Review: “For too long, managers have ignored the impact buildings and their design have on long-term corporate strategy... influencing behavior is almost all of what management is about, and buildings influence behavior... according to a plan that fits the company’s strategic design, or to a nonplan that doesn’t. They have effects on behavior, planned or not.”

Seiler’s assumption - a practical one- is that organizational performance is ultimately a reflection of individual behaviors: the behaviors of management, of employees, and of the network of suppliers, customers, and associates which operate in conjunction with each business. It is this network of individual behaviors which he credits both the physical environment and managerial strategy with shaping.

Seiler’s perspective was expanded in Melewar’s “Determinants of the corporate identity construct: a review of the literature,” when he cited the impact of the physical environment as a

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determinant of the Corporate Design.\textsuperscript{14} Though this would beg the question of whether corporate values first inform the physical environment or vice-versa, it may very well be that the two form a sort of positive-feedback loop where organizational culture begets a supportive physical environment, which promotes that organizational culture. Of course, even if corporate culture (or desired corporate culture, in the case of an unestablished culture) does inform the workplace design, we know that behavior (another of Melewar’s determinants) is in fact affected by the physical environment, and thus the impact of a designed environment may still independently shape corporate identity. This perhaps establishes the connection between environmental design and corporate culture that was missing in the 2005 study discussed earlier, where Symbolic design gestures revealed no connection to either employee Satisfaction or Effectiveness, but were posited to possibly effect company culture.\textsuperscript{1} Melewar posits that rather than affect culture through symbolic design, culture is established through the interrelation and accumulation of individual behaviors, and is thus a product of the physical environment’s effect on individual behaviors. Melewar agrees that the physical environment and management both seek to influence personal behavior to maximize the benefit to a company, but he also expands the scope of that influence to aggregate individual behaviors into organizational behavior.

This paradigm was echoed three years later when Diane Stegmeier, founder of Stegmeier Consulting Group- specialists in Workplace Change Management- and author of the 2008 book \textit{Innovations in Office Design: The critical influence approach to effective work environments}, the physical environment and organizational management to such an extent that changes in one cannot be fully effective without being coordinated with the other. “Workplace transformation creates an opportunity to drive other changes necessary for the organization’s success in the future,” but “the success of

\textsuperscript{14} Melewar, T.C. “Determinants of the corporate identity.” \textit{Journal of Marketing Communications} vol. 9, iss. 4 (December 2003): 195-220.)
workplace transformation is impacted by other influences on the organization’s workforce.”

Stegmeier identifies 15 total “Critical Influence Factors” involved in defining the success of organizational initiatives, including an organization’s structure, vision & mission, knowledge management, culture, business processes, core values, physical workspaces, corporate image, technology, leadership behavior, communications, compensation, rewards system, performance management, and authority/autonomy allocation — all of which are perhaps summarized with the term “organizational management.” The final component she identifies — notable for being the only non-managerial element identified by a career consultant in organizational change and development with no training in architecture or design — is the work environment. Stegmeier argues that “workplace transformation initiatives have a much greater chance of success when... part of holistic organizational changes, linking the need for adaptations in the physical work environment to specific business challenges and goals.”

Finally, the value of the physical environment to a workplace professional prompted Joanna Eley and Alexi Marmot to publish the 1995 book Understanding offices: what every manager needs to know about office buildings. In the remarkably forward-thinking description of trends in office design (they included sections on teleworking and a template desk ratio for dynamic work-sharing, among other topics) they emphasize the investment most companies make in their environment as an argument for devoting special attention to the potential benefits of thoughtfully considering how it relates to business.

Business shelves in bookshops are strangely empty of texts that explain anything at all about buildings to managers of companies. Managers of the buildings themselves are somewhat better served, but they do not manage the business. The skills associated with management of people and understanding business cultures are naturally the most important, since people are a company’s main asset and their biggest cost. None the less it seems reasonable that the next

biggest cost item, the building, should not simply be regarded as a liability, a drain on resources... Its potential not only in the capital balance sheet but also as an influence on behavior, as an enabler or inhibitor... as an influence on business cultures, should also be explored and understood in order to maximize benefits or, at least, to reduce waste.\textsuperscript{16}

In short, business initiatives benefit from the marrying of the business environment with strategic business strategy. The question remaining then, is what type of effect is most desirable to accomplish? If we accept the assumption that the goal of an organization is to sustain itself and increase capacity to operate effectively, then the necessary consequence of our management-environment joint initiative must be to succeed in the increasingly competitive free market economy. Thus, the dual management-environment initiative would seek to establish some kind of sustainable competitive advantage, or otherwise enhance organizational performance (the product of individual human behaviors) to continue operating in perpetuity.

Learning Organization Theory

The Fifth Discipline

In a 2008 article on the example of Toyota and their Toyota Production System (TPS), Steven Cavalieri sought to identify the driving force behind the automaker’s increasingly well-documented performance in a volatile market. In his discussion of various initiatives employed (including total quality management and lean manufacturing) Cavalieri proposes that “the capacity to improve the quality of shared organizational knowledge to a level that significantly higher than that of competitors is a critical organization resource.”

The conclusion Cavalieri reached thorough case analysis had, in fact, been discussed widely in the academic realm for nearly two decades. Depicted in Timeline format in Appendix I, management theory has featured a prominent conversation around the topic of learning, organizations, and competitive advantage. In it, we see that as early as 1989, the Chairman of Analog Devices Ray Stata was professing that “the rate at which individuals and organizations learn may become the only sustainable competitive advantage, especially in knowledge-intensive industries.”

In management theory, what Cavalieri called “[improving] the quality of shared organizational knowledge” and Stata called “the rate at which organizations learn” has been codified as “organizational learning.” Likewise, Stata’s “sustainable competitive advantage” corresponds to Cavalieri’s “a critical organizational resource.” Perhaps the clearest articulation of their shared meaning comes from David Garmin’s Harvard Business Review article in 1993, where he defined a Learning Organization as “an organization skilled at creating, acquiring, and transferring knowledge, (i.e. facilitating organizational learning) and at modifying its behavior to reflect new knowledge and insights.”

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qualification, regarding “modifying its behavior to reflect new knowledge,” Maula had examined the
difference between Learning Organizations and organizational learning and concluded that “Learning
Organization emphasizes structural and other aspects that make learning processes possible.” While
the origin of the term “Learning Organization” is largely credited to Bob Garratt’s 1987 book The
Learning Organization: Developing democracy at work, debate around definitions and models has
persisted: to the extent that Anders Ortenblad attempted to bring the disparate concepts together in
2002 in “A Typology of the Idea of Learning Organization.” In this model, he attempted to survey the
entirety of the various use cases for the term “Learning organization” and categorize them into four
disparate concepts, none of which would retain the original name but all of which would fall under the
conceptual category of Learning Organization. In his 2004 revision on the idea, however, Ortenblad
would restructure his argument by arguing that all four of his concepts were in fact complementary
components of the larger construct “learning organization.” Despite Ortenblad’s efforts to consolidate
the terminology and discourse, little to none of the subsequent literature appears to have adopted his
framework. One must also note that Ortenblad’s 2004 article appeared in the journal “The Learning
Organization,” which has been in publication since 1994 with ongoing research specific to this discourse
of research. This high level of research and terminological ambiguity existing nearly two decades after
the onset of the original theory suggests that the original theory and definitions could have been vague,
inadequate, or possibly dominated by a ruling model for an extended period of time and are still
undergoing re-examination. It is this final case which I believe lies closest to the truth, though it would
also be fair to critique Learning Organization theory as a largely abstract concept, which no doubt led to
some of the confusion around the use of the term we will discuss later.

Taken together, however, the available definitions (Maula and Garmin, as a representation of the modern consensus) conclude that a Learning Organization is one which generates competitive advantage through facilitating continual, systemic organizational learning. This reconciles well with our understanding of the “Information Age” as a period of nearly-universal access to previously advantage-defining knowledge through the internet. In fact, it is precisely this transition between knowledge-based to innovation-based systems that Soliman investigates in 2011, with transformational leadership and Learning Organization theory as the change agents. In a post-information-age environment, the parity of access to fundamental- and even specialized-knowledge is increasing and competitive advantage in a knowledge-based profession must be maintained by taking in knowledge faster or more effectively than the competition, or by creating knowledge which does not exist elsewhere. In short, Learning Organization theory seems perfectly poised to inform a professional, knowledge-based organization’s managerial practices, organizational culture, and physical environment. The question remaining then is what model of Learning Organization theory dominates the field.

In 1990, Peter Senge released the book *The Fifth Discipline: The art & practice of the learning organization*. This book, its sequels, and the relevant theories they espoused earned Senge the title of “Strategist of the Century” by the *Journal of Business Strategy* and one of twenty-four men and women who have “had the greatest impact on the way we conduct business today,” by the Harvard Business Review (Sept/Oct 1999). *The Fifth Discipline* has sold over a million copies, and was named one of the seminal management books of the previous 75 years as of 1997. In *The Fifth Discipline*, Senge establishes five “component technologies” for establishing an organization in which “people continually expand their capacity to create the results they truly desire, where new and expansive patterns of

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thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together”\textsuperscript{24}. In short, Senge sought to define a practice-oriented strategy of creating a Learning Organization. \textit{The Fifth Discipline} became a treatise on how to structure organizational management values and initiatives to encourage continual learning. More than just increasing learning, Senge systemized the process to inform itself such that the knowledge and awareness generated by the organization would inform the practices the organization itself, making the process one of organizational self-discovery and refinement as it learned to learn more effectively and respond to what it learned both about itself and about the outside environment.

The five “component technologies” of a learning organization Senge identifies are:

- **Personal Mastery**- “a discipline of continually clarifying and deepening our personal vision, of focusing our energies, of developing patience, and of seeing reality objectively.”
- **Mental Models**- “mental models are deeply ingrained assumptions, generalizations, or even pictures of images that influence how we understand the world and how we take action.”
- **Shared Vision**- “a practice of unearthing shared pictures of the future that foster genuine commitment and enrollment rather than compliance.”
- **Team Learning**- “the capacity of members of a team to suspend assumptions and enter into genuine thinking together.”
- **Systems Thinking**- seeing inter-relationships that underlie complex situations and interactions.

According to Senge’s theory, an organization which can facilitate these core concepts can establish a cycle of perpetual learning and self-improvement, which will then generate a sustainable competitive advantage for the organization. Applied to a professional environment, this system-when

properly facilitated by organizational leadership and the physical environment—would then produce a business which learns faster, produces more efficiently, generates new knowledge (is more creative), and maintains a marketable competitive advantage over other firms.

Due to its wide exposure in both the academic and professional discourse, its predominant position in the establishment and publication of Learning Organization theory, as well as its largely application-focused framework, Senge’s model of Learning Organization theory will provide the foundation for this research.
Senge’s seminal work, *The Fifth Discipline*, is largely influenced by his educational background in both engineering (he earned a B.S. in Aerospace Engineering from Stanford) and in the social sciences (M.S. in social systems modeling, philosophy courses at Stanford, and a PhD in Management from M.I.T.). It is this combination of education that likely contributed to his emphasis on systems thinking, and its potential as a solution to “wicked” or “divergent” problems. Robert Flood (B.A. in Systems and Management and PhD in Philosophy in Systems Science) noted in 1998 how Senge takes a somewhat reductive view of problem-solving. Flood disputes the notion that any problem has a perfect answer, as business-environment tasks of any complexity will involve a human component, and therefore Senge’s idea that any situation can be defined as a “convergent problem” is flawed and fails to account for the full system affected. Flood goes on to argue that Senge’s solution for the other type of problem, “divergent” problems where various stakeholders have competing interests, is insufficient. Senge calls for the generation of consensus through open dialogue and intentional exploration of mental models to better understand the other parties’ perspective, underlying motives, and using them to build a shared vision which resonates with every party. Senge calls this “opening-up consensus.” Flood argues that such an idealistic solution is no solution at all, in that it implicitly defines boundaries around the consulted stakeholders and produces an optimal solution for them, but cannot account for the interests outside the system. Theoretically, this could lead to a perpetual series of ever-expanding systems and solutions, each attempting to resolve the consequence of the prior decision. Finally, Flood challenges Senge’s idea that consensus can be conclusively reached in all situations:
“One possible explanations for Senge’s apparently erroneous belief in consensus is a limited appreciation of forces that can break down discussion and dialogue that precede consensus... Senge stops well short of a central issue in the social sciences- knowledge-power and social transformation.”

Flood’s argument is that consensus cannot be a reasonable metric for success in management as it does not accommodate the myriad social factors and systemic consequences. This argument sounds reasonable, except that Senge’s disciplines are not meant for individual implementation and analysis: meaning Senge might argue that careful examination of mental models and a true team learning environment would preclude such destructive social factors over time, teaching the organization and members to train themselves out of such behaviors. Nonetheless, Flood does raise some meaningful concerns about the potentially utopian lens through which an engineer with system’s thinking background (who describes himself as a “practical optimist“) might view social challenges.

While a fair (if pessimistic) critique, Flood perhaps over-states the consequences of Senge’s model, and in fact he proposed no solution in replacement. He suggests an overhaul of Senge’s learning organization, but did not propose any definitive modifications or solutions until a year later, with the publication of Rethinking the Fifth Discipline in 1999. Interestingly, Senge also had a publication that year: The Dance of Change, which focused on identifying common arguments against implementing Learning Organization initiatives in the workplace, rather than in the realm of research and theory. In fact, this was Senge’s second supplementary work to The Fifth Discipline, as he’d already released The Fifth Discipline Fieldbook in 1994- another workplace-focused book, this time a series of practical exercises and techniques managers could use to build/support the five disciplines in their organization. This theme would continue in 2000, as well, when Senge would publish Schools that Learn, a guide to implementing Learning Organization theory in the education sector, where he’d received inquiries on

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how to overcome a system which largely had not adapted to an Information Age model his theories were built around. Senge’s almost tacit dismissal of his academic critic was telling: Senge was first and foremost a practitioner, not an academic, and his theories were meant for managers in the workplace rather than rigorously peer-reviewed journals. Even in 2006, upon the re-publication of *The Fifth Discipline* with a new chapter and revised material, Senge did not attempt to rework his theory. Instead, he utilized the opportunity to include additional “lessons from practice” to guide managers towards practical implementations of these abstract concepts. His approach was arguably to produce a meaningfully developed set of tools, a framework of management strategies, and to let managers implement and adapt the flexible concepts to their specific circumstance. While Flood (and others) pursued the ideal model, Senge sought the marketplace impact of practicality and trusted that the total package would stand the test of time accordingly.

Nonetheless, Flood’s approach to academic rigor of *The Fifth Discipline* is noteworthy, as he appears to be the prominent critical voice in the post-*The Fifth Discipline* discussion. In doing so, his 1999 book *Rethinking the Fifth Discipline* focuses on Systemic Thinking and how Senge’s approach compares to other thought leaders’ perspectives. While he critiques Senge for focusing on systems dynamics- one of several categories of systems thinking- he does not dismiss Senge for it26. Rather, Flood weights Senge equally with other notable experts, including Bertalanffy, Beer, Ackoff, Checkland, and Churchman, in order to build a more holistic “fifth discipline” which might enhance Senge’s Learning Organization model. In doing so he establishes two unresolved questions of systems thinking: Where are the boundaries of a theoretically infinite system, and how do we decide who benefits? Flood suggests Senge side-steps the issue, as well as the earlier discussed issue of social issues interfering with resolving divergent systems. In this discussion- largely repeated from his 1998 article- Flood outright dismisses

Senge’s prescription of eliminating hierarchy as a potential solution because Flood rightly describes such a policy as counter-systemic, since it does not respond to the local system and condition.

Flood’s response to the question of boundary is somewhat simplistic, but perhaps as conclusive as any systemic problem can be resolved: he reasons that rather than defining a boundary through a problem (as Senge implies) that a system can be bounded by its locality. Locality in this sense is not geographic, but spatial and temporal. Thus, a system thinker defines their limits by what is immediately observable, predictable, and controllable, with a consciousness of the greater system but not an obligation to it. To offset any ethical dilemma, Flood suggests adopting C. West Churchman’s alertness to the ethics of system boundaries, as they determine who benefits and who does not from any given solution. Being mental constructs, Churchman suggests that boundaries to systems must be held subject to continual reevaluation and ethical questioning, and in this sense we may conclude that systems boundaries operate much as- or are derived from- Mental Models in Senge’s LO system. Finally, for all Flood’s critique of Senge failing to address the issue of knowledge-power systems, Flood fails to propose any meaningful systems or solutions to the challenges such social factors face. Instead, Flood calls for contemplation and conscious questioning on this issue while implementing change, and leaves the issue otherwise unresolved despite dedicating a chapter to it in part II of his book.

Ultimately, Flood seeks not to overthrow Senge’s The Fifth Discipline, but to supplement the system dynamics background with a more academically robust perspective on systemic thinking. There are other critics who are not so restrained. In the 2011 article, Raymond Caldwell primarily argues that Senge’s perspective of systematic change is flawed, again arguing that Senge fails to consider the “power and politics in understanding the dynamics and limits of organizational learning,” effectively repeating Flood’s challenge from a more aggressive stance\(^2\). He goes on to comment on Senge’s 2006

assertion that in a modern learning organization, change agent consultants become unnecessary.

Caldwell argues that Senge has insufficiently considered the challenge of agency in an organization: that democratized learning and power put the onus on individuals to make infrastructural changes beyond their capability. This is perhaps the most dominant critique of Senge’s model: that *The Fifth Discipline*’s model of leadership is undefined and largely puts too much initial expectation on the general members of the organization without providing managers- who are likely the most knowledgeable and strategic partners in the change process- clear direction toward empowering and facilitating the kind of system-defining cultural and institutional change.
Response: The Sixth Discipline

Due to the critical assessment of Senge’s work regarding the impracticalities of distributed leadership, as well as subsequent research and the emergent models of organizational leadership, I am proposing an addition to Senge’s five disciplines. For maximum organizational management and performance, aspiring learning organizations ought to pursue facilitative, empowering leadership practices: a sixth discipline titled “Empowering Leadership” which is focused on using knowledgeable change agents with authority to implement managerial policies and initiatives to activate the latent learner and promote the desired behaviors of LO in the workplace.

Senge may have sought to address these concerns in his following literature by addressing management tools and techniques for cultivating the five disciplines, but perhaps there is a series of environmental factors he has not considered which could facilitate- but currently hinder- successful LO implementation. As discussed previously, Stegmeier nominated fifteen separate variables which affect culture, one of which was the physical environment, the remaining being practical policy tools for organizational management. Perhaps Senge’s theory needs to be fleshed out in more express, culture-shaping terms: how is compensation structured to promote learning and reflection, rather than just production (personal mastery)? How does technology augment both team learning and exploration of mental models? And finally, the premise of this thesis: in an organization where managers seek to facilitate the six disciplines, where the managerial articles and organizational policies shape a culture of organizational learning and self-revision, how can the physical environment of an office facilitate this sustainable competitive advantage of systemic learning?
The Learning Community- Defining a Program

If Senge’s five disciplines are to be cultivated in a workplace, then the ideal client would be one who’s workplace behaviors benefit from all five of Senge’s components. That is, Learning Organization theory might not apply, perhaps, to certain types of work styles. We will explore the five disciplines individually below to determine which organizations might be the most appropriate fit, and which perhaps would not benefit from LO theory.

Personal Mastery: in order to require personal mastery, an individual’s work must include some need for personal, specialized knowledge or skill, ideally one cultivated over time but which is improved with experience and focus. Thus, the ideal client would be one where intensive work requiring cultivated skill and knowledge takes place.

Mental Models: Understanding one’s core ideologies and how they shape response is a large part of Senge’s theory. Contributing to both personal mastery and the building of shared vision, this form of self-reflection would suggest greatest benefit for work with a subjective component: where room for an individual’s biases exists and would lead two individuals to find separate, equally individually valid answers to the same question. This may rule out such traditionally linear office-based industries as accounting, engineering, or tech support. It also implies that a creative industry- one featuring a design or artistic component- might be most appropriate for focus on this type of self-reflection.

Shared Vision: Would the organization benefit from employees embodying a collective idea of the organization’s purpose? While most every company champions the idea that their organizational culture is ubiquitous, there are some notable exceptions. Universities, for example, frequently employ individuals of widely diverse ideologies and values- even methods and aspirations- for teaching. Some professors teach only as a means to support their research, and the university supports this because the
value of that research enables a small, high-performing group of students to advance their field of study. If every professor shared the same research-focused vision of education, the majority of students may never receive a proper, supportive education. Without the research-intensive faculty, the university may never contribute academically to the greater knowledge of the world- a valuable vision in its own right-and would under-serve the core students who demand such opportunities. For a university, one shared vision across all faculty would be counter-productive.

Team Learning: “The ability of a team to suspend assumptions and enter into critical thinking together” outright defines that at least some significant portion of an organization’s work be done in a collaborative process. This would exclude sole practitioners of any industry, as well as largely individual-based consultancy practices (though they may benefit by facilitating team learning in sessions with clients) and businesses which operate as a collection of Agents which operate independently. Such organizations may include many medical professions (such as dentistry), athlete’s or actor’s agencies, and insurance offices.

Systems Thinking: For organizations to benefit from Senge’s LO theory, they must possess individuals whose work is part of a larger operation. Individuals whose work does not end with them, who are part of a larger network of dynamic pieces, benefit most from systems thinking. Cultivating systems thinking among such a workforce allows for individuals to learn from and about the larger system in order to improve their processes for the future, generating systemically-beneficial decision-making.
The ideal Learning Organization thus includes the following characteristics:

- Both collaborative and highly individual work demands in a team environment (Personal Mastery & Team Learning).
- High task complexity requiring cultivated personal abilities (Personal Mastery).
- Task ambiguity with room for personal biases to have influence (Mental Models).
- Benefit from organization-wide consensus on mission & vision (Shared Vision).
- Individual tasks/roles which are part of a larger network (Systems Thinking).

While a good number of professions may qualify, a significant subset of qualifying professions appeared in the Design industry. These included Architecture, graphic design, industrial design, game & application development, etc. It was in attempt to identify justification to select one over the rest that the discipline of Systems Thinking revealed a natural alternative: rather than designing for one specific design firm- which would inherently possess a corporate culture or values which might conflict with the design of “their” space- the opportunity is to present a “shell” office environment for multiple design firms in a co-working– arrangement. In this manner, the program took form: a “design firm cultivator” for small design businesses (between five and twenty-five employees) with access to shared resources and facilities (such as a library, tech support, and workshop) so as to decrease overhead while maximizing opportunity to compete with larger, more established firms. Most critically, this allowed the facility to be developed independent of individual organizational culture, as no space is identified as uniquely “owned” by a particular organization. Also, the size and potential youth of these organizations suggests that individual behavior is less likely to be “entrenched” by experience. This liberates the design to focus on facilitating the six disciplines, which are applicable across all the prospective tenant organizations, with more malleable behavior patterns to affect.
Site: Analysis & Selection

Criteria

The ideal site for a Learning Organization would contain characteristics supportive of multiple disciplines. A compilation of desirable qualities by discipline would include:

Mental Models & Personal Mastery

- Areas of low ambient noise (buffer from major roads, concert/festival venues, etc.)
- Similarly low visual activity/distraction.
- View to nature (biophilia).

Shared Vision

- Located along pedestrian thoroughfare (opportunity for display).
- Proximity to community gathering space (cultivation of community).

Systems Thinking & Team Learning

- Proximity and accessibility to diversity of small businesses & community stakeholders
- Proximity to high-density residential options.
- Access to design-focused academic institutions (new ideas & consulting opportunities with researchers & professors)

Additionally, desirable qualities for new development include unobstructed natural light, proximity to readily available public parking, proximity to public transportation, and neighborhood “upside,” or the opportunity to see increased value of the property over time through development.
Located in the Clifton neighborhood of Cincinnati, Ohio, 2717 Vine Street is a currently undeveloped collection of lots with ideal properties as listed above. Vine Street (locally known as “short vine”) is a pedestrian-centered corridor of diverse small businesses, including franchises, local restaurants, retailers, and other amenities as depicted in Figure 1. The West boundary is Glendora Avenue, a quiet, primarily residential street with minimal traffic- pedestrian or vehicular. Portions of the site are currently divided among several adjacent properties, including a public parking lot and an access driveway to the rear of the adjacent facilities to the north (figure 2). Other existing conditions on the site include some on-site parking and a small mechanical equipment enclosure for the restaurant to the south.

For the purposes of design, this project is incorporating the area of the on-site parking and will design the new relationship between the public parking and the incubator- including circulation. This design also proposes to leave the existing access drive as it exists to maintain vehicular circulation and access (Figure 2, red arrows) but to relocate the mechanical equipment either on top of or to the West face of the adjacent restaurant. This is consistent with the local neighborhood design convention, with Vine-facing developments abutting each other.

The final existing component on site is a concrete staircase and sidewalk transitioning from Vine to the existing parking to the Glendora sidewalk (Figure 3, Dashed Black Line). As a critical component of neighborhood circulation, as well as an opportunity to promote the discipline of shared vision, this circulation component is relocated to the south edge of the site (Figure 3, Pedestrian circulation- solid black lines).

The site lies between two existing single-story restaurants, allowing for plentiful natural light in most levels due to an expansive Southern exposure and relatively narrow width (75 feet, compared to
190 feet in length). Additionally, this site is across the street from the University of Cincinnati Niehoff Urban Studio and less than a half mile from faculty experts at the University of Cincinnati College of Design, Art, Architecture, and Planning and the Lindner College of Business.

The Short Vine area has been experiencing dramatic development and improvement in the past decade, as gentrification in Over-the-Rhine and development along the nearby Calhoun Street University Square area has led to increased student and consumer activity in the area. With the pending completion of a new Kroger’s grocery and Walgreen’s Pharmacy (Figure 1) and several new apartment complexes catering to the increasing student population, Vine is an ideal location for small design businesses to capitalize on an improving neighborhood with deep ties to creative disciplines which regularly produces top talent.

In summary, 2717 Vine Street features all the listed conditions for Learning Organization development and is economically and logistically suited to the development of a design business incubator.
Figure 3 - Community Connectivity

Figure 2 (left) – Site and Existing Elements

Figure 1 (right) – Site Circulation
The foundation for Senge’s Learning Organization structure lies in the fundamental differences of the five disciplines. Senge argues that Systems Thinking serves as a sort of binding agent to the theory, requiring participants to recognize the system of the disciplines itself in order to recognize the relationships between them and optimize the learning process. In the physical environment, therefore, it becomes critically important to understand the interrelationships between the disciplines and to organize them (and the participants’ progression through them) in such a way that is respective of their inherent natures and how those natures correspond to each other. If the process ends by tying all the disciplines together through self-referential systems analysis, then it must begin by understanding the optimal physical environments for each condition and how these environments relate to each other. Only once the disciplines (and their environments) are fully understood and organized can they be optimized both within themselves and as a collective.

To organize the five (six, including empowering leadership) disciplines, this research selected twelve environmental variables which collectively determine workplace experience. These represented a variety of concerns, including conventional architectural (desirability of natural light), logistical (access to technology), conventional interior design (tactile quality), to behavioral/psychological (ownership). The twelve variables are listed and defined on the following page.
• **Participating group size** - Percent of a given organization which collaboratively participates in a given task at any one time.

• **Desirability of natural light** - Amount of natural light consistently desired to promote the mindset of a given discipline.

• **Flexibility** - A measure of how much change one should be able to exert on their physical environment to support varying tasks associated with a given discipline.

• **Ownership** – The amount of personal, exclusive control maintained over a space while engaged in a given discipline.

• **Tactile quality** - A measure of the desired physical expression of material as experienced by the sense of touch. Ranges from “Absolutely rigid” to “Completely malleable.”

• **Frequency of Use** - A measure of how often individuals are meant to engage in a particular discipline. Ranges from “Constantly” to “Rarely”

• **Access to technology** - The amount to which electronic devices facilitate the activities of a given discipline.

• **Visual Vibrancy** - The amount to which visual complexity and color contributes to the desired psychological/emotional state of a given discipline.

• **Area Size** - a measure of the space perceived to be occupied per individual while engaged in a given discipline.

• **Visual Privacy** – The amount of perceived “shelter” desired from the perception of others while engaged in a given discipline.

• **Acoustics** – A measure of the desired number and volume of audible sources of information or distraction available when engaged in a given discipline.

• **Public Access** – How readily foreign visitors to the facility ought to be able to access an individual when the individual is engaged in a given discipline.
Discipline Icons

The following pages will explore each variable independently before aggregating them into organizational relationships and insights for the planning of space. The resulting diagrams use these icons to graphically represent the various disciplines:

- Mental Models
- Systems Thinking
- Personal Mastery
- Shared Vision
- Team Learning
- Empowering Leadership
At any given time, individuals within the organization- as well as guests and outside stakeholders- will engage in the various six disciplines. When this happens, different disciplines call for different numbers of simultaneous participants. For example, Shared Vision is best defined and reinforced when as many stakeholders and participants as possible are included and share that unified consensus. Personal mastery and Mental Models, however, are inherently individual activities which may be undertaken by multiple individuals simultaneously but ought to be actively separated from each other so as to prevent interference between the individuals. Systems Thinking- as a discipline- experiences the widest range of variation because individuals are meant to actively engage in a Systems Thinking mindset regardless of how many individuals involved: it could be with the entire organization or solely as an individual. Team Learning (TL) and Empowering Leadership (EL) also exhibit some range of values as both are inherently inter-personal activities. While it is potentially conceivable that a full organization and stakeholders could engage in either TL or EL, these activities become unwieldy as participants are added. For this reason, both these disciplines were given a range representative of their “small group” nature.
While the benefits of natural light in the workplace are myriad and documented by both academic research and professional anecdote\textsuperscript{26}. However, for the purposes of Learning Organization-based design, certain disciplines call for greater emphasis on natural, diffuse light. For example, Personal Mastery is an incredible task-oriented discipline which might benefit greater from task lighting than potentially distracting and open-environment daylight. Likewise, Shared Vision calls for a group collective focus: large amounts of daylighting may restrict light dimming to consolidate attention on a display or individual. This is a similar, if lessened concern with Team Learning. However, Team Learning, Empowering Leadership, and Systems Thinking are all highly inter-personal disciplines which intuitively should benefit from bright, comfortable lighting. Finally, Mental Models might initially seem opposed to natural light as a highly introspective practice, but the stress-relieving quality of natural light is inherently conducive to Mental Models-type introspection and separation from the dynamic work environment.

For Learning Organization disciplines, flexibility can be either an opportunity to support individual idiosyncrasies, but personally customizing an environment also creates opportunities for distraction. Therefore, Personal Mastery calls for only as much flexibility as is necessary to work on a given task efficiently- which is to say, minimal. Shared Vision likewise calls for only as much flexibility as necessary to organize the number of individuals. Systems Thinking averages to a middle value of even balance between standardization and customization because the while the activities of systems thinking can be exceptionally dynamic, excess personalization can also restrict the inter-operability and cohesiveness of the system environment. Team Learning exhibited a similarly wide range of flexibility primarily because the activities engaged are highly diverse. Team Learning averages more flexible than Systems Thinking because the team using a TL space changes more often than the team using a ST environment. Finally, Empowering Leadership and Mental Models both call for highly flexible space where the uniquenesses of each person are respected and accommodated to further growth and comfort while contemplating difficult concepts.
Personal ownership of a physical space may manifest itself in a variety of ways, including the propensity to customize it, maintain it, become defensive within it, and feel safer or more comfortable in it that outside of it. The Learning Organization’s disciplines have different inherent levels of personal ownership, ranging from the intrinsically held and deeply personal Mental Models to the collectively shared, perhaps minimally invested Shared vision. Interestingly, this sense of ownership inherent in a discipline correlates with the number of individuals typically engaged in that discipline at a particular time. The organizational challenge, therefore, would be to ensure sufficient levels of engagement with the less inherently personal disciplines and to bring the highly individualistic (Mental Models and Personal Mastery) to the front of the collective consciousness so that they become integrated into the community development.
The six disciplines are inherently abstract mental constructs with some variation in application and interpretation depending on their context. However, there is a certain sensational quality inherent to each with may facilitate their implementation in a physical environment. For example: Mental Models are inherently abstract, often the formation of years of experiences and emotions building into preconceptions and intuitive interpretations. To encourage reflection on such concepts, the physical environment may employ soft, abstract forms and sensations to reflect the shifting amorphous nature of these “lenses” with which one observes the world. Likewise, personal mastery is the most rigid of the disciplines as it is highly task-centric. Shared Vision is primarily a discipline of clarity and unanimity, making it similarly rigid. Systems Thinking is critically lambasted for failing to define how to define a system, as any boundary is effectively arbitrary and subject to interpretation but is generally rigid once set. This rigidity/arbitrary relationship gives Systems thinking the widest range. Finally, Team Learning and Empowering Leadership exhibit similar qualities of small-group customization and inter-personal definition, so they resid on the malleable end of the spectrum.
The varying disciplines were not all designed for constant, or even daily use. For example, while Shared Vision is meant to serve as a constant organizing element, it only needs to be defined/revisited on rare occasions. Ensuring that team members are operating in line with the established shared vision is the realm of Empowering Leadership Team Learning. On the opposite end of the spectrum, Systems Thinking is meant to shape daily activities on an ongoing basis as stakeholders consider how their work is influenced and influences the greater whole. Personal Mastery and Empowering Leadership are, ideally, daily exercises, varying by the responsibilities of the day. Finally, while an individual needs to be mindful of their Mental Models as often as they are of the greater system, the process of identifying and changing those models—the task for which a particular space is being designed—is a far rarer occasion.
The visual dynamics of an environment amount to a measure of stimulation each discipline encourages individuals to receive at a given time. Systems Thinking calls for information from multiple sources at any given time, as inspiration and relevant data for all stakeholders is shared freely. In contrast, Mental Models can call for as little as no visual data as it calls primarily for introspection but can include visual cues and guides. Shared Vision calls for at least a modicum of visual reinforcement, but its environment is primarily subdued so as not to interrupt the consensus-building activities. Personal Mastery calls for primarily subdued environments, but requires enough dynamic information to stimulate whatever task is at hand. Similarly, Team Learning activities call for a supportive, stimulating, but not distracting environment for multiple individuals, and is more likely to feature graphics and changing elements. Finally, Empowering Leadership is highly active and engaged, operating in both the Team Learning, Personal Mastery, and especially Systems Thinking environments and thus calls for changing, bright environments.
Technology in the workplace is at a premium in recent history, and most companies compete to offer the most, most seamless technology to facilitate their mission. However, as offices become more electronic, it is worth noting that not all disciplines call for or even benefit from internet connections. For example, Personal Mastery- the discipline most employees feel unable to master due to workplace distractions- only requires the technology specifically necessary for the task at hand, and it’s still the second-most dependent discipline. Truly, only Systems Thinking appears to truly benefit from the always-connected workplace we often see today. Shared Vision is about what people aspire to, and is while the methods of building consensus and vision may be electronic they don’t have to be. Team Learning, likewise, is conducted inter-personally and any technology greater than reference material is normally observed as a distraction. This same argument is even more relevant to Empowering Leadership- the discipline of understanding and communicating with people on a personal level because electronic forms of communication are inherently less rich in communication than face-to-face dialogue. Finally, Mental Models may use electronic guides, but deep introspection is an predominately analogue process.
Rather than presumptively diagnose the areas of a final design, this variable measures one’s perception of the space occupied by the group. For example, Personal Mastery calls for one person to perceptionally occupy only the space they are utilizing to conduct a task. In contrast, when engaged in building Shared Vision the individual perceives the space occupied by the group more so than they are concerned with the space they occupy personally. In this sense the design focus shifts between small pockets of personal influence to large volumes of group occupancy. Mental Models is an introspective discipline and so the individual can perceive themselves occupying no space if they close their eyes, but presumably will occupy as much space as is defined for them personally otherwise. Empowering Leadership involves at least two individuals occupying space and thus exhibits a wide range of areas, while Team Learning calls for larger spaces to support three or more. Finally, Systems Thinking calls for any number of individuals to engage in thought with minimal boundary. This gives it a large range of areas occupied, all on the larger end of the spectrum.
Perceived from one individual to another within the facility/organization, privacy varies distinctly between disciplines largely based on independence and exclusivity. For example, Mental Models are a highly personal exploration which may reveal some deeply intimate revelations, and individuals in that situation would require a sense of privacy and shelter to offset the vulnerability of such an investigation. Personal Mastery likewise calls for visual privacy of task: work which is highly personal and creative can be subject to criticism and high privacy to engage in such tasks is paramount. Team Learning has a similar privacy: the group may wish to shelter their activities from observation during initial creative stages to avoid a sense of judgement from outside viewers. However, in Team Learning the result is less a reflection of the individual than it is of the collective, and so such concerns of privacy can be less sensitive. Empowering Leadership experience a moderate sense of privacy, mostly because while the majority of inter-personal management that takes place in the workplace is public, there are rare occasions for which high privacy is called for. This will require two unique spaces to accommodate. Systems Thinking is a primarily visually public activity, only exceeded by the cultivation of Shared Vision.
The desired acoustic environment for Mental Models is primarily silent, perhaps with audio cues for reflection or a pleasant, subdued, ambient audio experience. Personal Mastery likewise eschews audible distraction, though each individual may desire music or other audio to support their state of “flow” or peak performance. Empowering Leadership has a high range of acoustic environments ranging from high-volume active management in a complex environment to private conversations free of audio distractions. Shared Vision is ideally cultivated in a moderate environment where a few select conversations at most are taking place. Team Learning is an acoustically isolated but dynamic exercise where several people may be dialoguing animatedly at once. Finally, Systems Thinking calls for information to be communicated frequently and without restraint, resulting in a primarily dynamic environment.
Public Access to the area reserved for a discipline is paramount to supporting proper circulation and senses of hierarchy and security. When engaged in the sensitive, intimate reflections of Mental Models, for example, interruptions from clients are more than distracting, they invade a mental exercise of sanctuary. Thus, Mental Models ought to be supported in the most private section of the facility.

Similarly, Personal Mastery is by definition an exercise of singular focus: interruptions from colleagues and outside visitors should be discouraged if at all possible. Team Learning, as a collective exercise is difficult to maintain with excess interruptions, but invited stakeholders should be able to find and gain access from the public realm. This is also true for Systems Thinking, though it is by definition more organic and less disturbed by the addition of another party. Empowering Leadership is still more public, as the management serves as a buffer between the public and the organization, while Shared Vision outright encourages all stakeholders- within and outside the organization- to understand and align themselves with the organization’s values.
Summary: Discipline Values

The top, bottom, and midpoint of the brackets for each discipline on each metric correspond to a value on a 100-point scale. Using these values, the following charts and analysis techniques depict some key design and organizational insights, including:

1. The optimal environmental conditions determined for each discipline

2. The covariance of each discipline with the others: the propensity of one to be high when the other is high. This covariance can then inform which disciplines ought to be located in proximity to each other. Positive values of covariance indicate similar trends between the various metrics, negative values mean the disciplines move in opposite directions.

3. Overlap percentage between the disciplines: the numerical value of overlap between disciplines divided by the minimum range of either discipline on each metric. This can represent the amount of shared condition between the disciplines and thus to what extent they may occupy the same physical space.

Key insights of this data are listed at the end.
Correlation: Mental Models

Correlation: Personal Mastery

Correlation: Empowering Leadership
Observations

**Shared Vision:** Shared Vision shares only a slight positive correlation with Systems Thinking, and the highest overlap is with Mental Models at below 30%. Shared Vision, therefore, must either be considered its own, highly independent design environment, or become a network of highly differentiated spaces which respect the qualities of the locally adjacent disciplines which still serves to build/facilitate a common idea/set of values. Given its prominence as the most public of the disciplines, it could serve well in a circulation/organizational capacity, so long as it includes at least one gathering space which meets the ideal design characteristics.

**Team Learning & Empowering Leadership:** Team Learning exhibits an overlap of greater than 65% with Empowering Leadership, as well as a moderate correlation. This suggests that by designing a variety of unprogrammed breakout spaces with sufficient variety, it may be possible for these spaces to serve both purposes as needed, especially since the combined overlap between Empowering Leadership and Shared Vision + Team Learning is approximately 120%.

**Systems Thinking:** There is approximately a 45% overlap between the qualities of Systems Thinking and Team Learning, second only to the 55% overlap with Empowering Leadership. This suggests that for many circumstances, the two may share space, especially given their strong positive correlation.

**Mental Models:** Mental Models correlates extremely negatively (-0.6) with Shared Vision. Given their opposing relationship, the next most severe incompatibility appears to be with Systems Thinking, These are both perhaps intuitive, but the lowest overlap in quality of space fell between Mental Models and Team Learning. The only overlap of perhaps beneficial significance is with Personal Mastery (approximately 45%, correlation of 0.4) which suggests these two could experience some overlap and ought to be located near each other.

**Personal Mastery:** Unlike Mental Models, Personal Mastery shares highest overlap with Team Learning despite a basically neutral correlation. This unusual relationship suggest that while a Team
Learning space may not be ideal for individuals to practice Personal Mastery, it might be converted to do so if demand required. Similarly, if a variety of Team Learning spaces with slightly different characteristics were included in the project, as suggested in the Empowering Leadership section, some may be designed to support Personal Mastery while others support Empowering Leadership, thus increasing the flexibility of utilization of space for the total facility.

One note of concern in this evaluation comes from Senge’s observation about problem-solving in Learning Organizations as a whole, specifically his breakthrough regarding the “fifth discipline” which unified the theory: Systems Thinking. Senge argues that the primary solution method of society is to break a problem down into ever-smaller parts, solving those components independently, then putting them back together again: the “reductive” strategy of problem solving. This, he argued, is a flawed methodology which creates as many problems as it solves because it produces inefficiencies in the way the parts work in relation to each other.

In the design portion of this project, the challenge is to produce spaces which are informed by the reductive process demonstrated thus far, but not defined by it. Ultimately, the system of these spaces must operate cohesively as a collective, even at potential expense of individual optimization.
Final Design & Discussion

In accordance with the concept of disparate, unique disciplines—each with an optimal configuration of values for each of the twelve characteristics—this design focused on the arrangement of disciplines with each other and then on providing unique physical environments tailored to the exact needs of each one. In some sense, this is a “schizophrenic” approach to design, as it eschews the concept of uniformity that one normally associates with a cohesive culture-focused work environment. This is because the project does not celebrate any one particular client or company, and thus has no set culture values which might desire to be expressed in all spaces. Instead, the project celebrates the Disciplines themselves by expressing them individually and uniquely. The following sections discuss the design of each discipline’s environment and the role it plays in the larger context.
Shared Vision

Given the dramatic level of public engagement with this building—particularly for the purposes of building Shared Vision and understanding systems larger than the specific scope of individual organizations—this design utilizes the initial premise of circulating visitors around the building and continues it by using Shared Vision space as an entry and circulation avenue for both visitors and daily users. This total network of interior and exterior circulation for all users encourages the unification of experience and the privacy of less public disciplines (Figure 4). Given the sectional nature of this project, this circulation component necessitated a prominent vertical circulation element of some nature. Early versions of the design considered a ramp, but the challenge constraints imposed by the site and slope for accessibility impeded the development of other disciplines and thus proved to be non-viable. Likewise, an elevator of sufficient size to unite vision and serve large numbers of people simultaneously was logistically infeasible. In the development of early drafts, it became clear that a stairwell—if properly designed—would best match the identified characteristics of the Shared Vision Discipline. Because the “group size” associated with Shared Vision encompasses all stakeholders—no matter the scope of their involvement—the stair must serve as more than a place of transition for individuals lest the experience change between users over time and alter the shared experience. The stair therefore becomes a place of congregation, of group meeting without visual separation. This led to the concept of an “auditorium stair” (figure 6) which would allow for one continuous experience of space connecting all levels and allowing for large groups to gather and share a uniform experience. To simultaneously honor the low visual privacy and low natural light levels, this primary auditorium stair is located along the north edge of the site, where no view-interfering shading features are needed to mitigate direct natural light as they are employed on the south, east, and west facades. Bench-style seating with uniform wood surfaces prevent users from establishing mental “ownership” of space as the user is unable to demark territory with anything innate in the space. The rigid tactile quality provided by the concrete, wood,
glass, and sheer white surfaces supports a sense of clarity and uniformity, while colorful, moving cushions provide the slight visual vibrancy and flexibility needed to provide comfort for extended periods of time in the space. The total quality of space achieved by these initiatives is displayed in Figures 5 and 6 below.
Finally, the fundamentals of Shared Vision are expressed in the façade of the building. Shared Vision calls on users to recognize the narrow scope of their own inherent perspective on a given topic and to consciously direct or expand that mental understanding into alignment with the rest of the organization. As the façade is the initial- and sometimes only- interaction some may have with this facility, it was appropriate to express some aspect of this concept to the public and invite them to take action by engaging with it. The implicit message is: each of us sees only a piece, but collectively- inside this screen- we come together with undivided vision. In an admittedly literal interpretation, this concept is expressed as a series of perforated Corten Steel fins protruding from the glass curtain wall. These fins
restrict the view of any individual depending on their distance from the façade and angle to it, but regardless of location the effect is the same: the user sees only part of what lies on the other side.

The fins themselves vary in depth and spacing according to the type of program behind them (Figure 7). Around of the Shared Vision lobby and along the exterior stairs, the fins are twelve inches deep and twelve inches on center. Around the Team Learning and Personal Mastery spaces, the fins are six inches deep and six inches on center. This denser array supports a sense of barrier and privacy for occupants on the interior while the deeper, wider opening on pedestrian level frame the views and invite users to stop and study the work on display in the Lobby.

Around the Systems Thinking mass of the facility, the south-facing louvers are angled eastward at 70 degrees from the curtain wall (Figure 7). This orients the view openings to face the main promenade on the east face of the building and increases the mid-day and evening shading provided by the fins for the interior. There are additionally select instances where the fins peel back from the mass and allow uninterrupted views. The first is the entrance (Figures 7 & 8), where the procession around the filtered views culminates in a “passing through” where individual perspectives are removed and an unobstructed, shared vision is celebrated. In a similar manner, the Shared Vision stair- the place of congregation and unified ideal-building- is also left unshielded by the Corten screen. Another occasion where the fins are remain absent is the perpendicular face of each Team Learning mass when that discipline is cantilevered into the public realm. This celebrates the creation of new knowledge by affording the public a brief glimpse into the activities of the space, inviting them to come take part. Finally, the garden-facing surfaces of the Mental Models reflection rooms are garden-facing and are meant to be a place of introspection. While a reminder of the division of view may encourage users to consider their own perspective limitations, the vertical obstructions limited the views to the garden and over-emphasis the message of unification at the expense of the individual. Mental Models are inherently valid- they are experience and training-acquired- and thus differ from a particular person’s
‘vision.’ The Shared Vision screen is left absent of the Mental Models experience because it devalues the individual in favor of the collective, while Mental Models focuses on understanding the individual without attempt to alter or conform it to a shared expectation. This is also possible because the Mental Models spaces are inward-facing, and thus do not need to maintain a consistent façade with the outermost surfaces.

Figure 7: Entry Perspective

Figure 8: Vine St. Plan, Fin Examples
6” deep on 6” centers perpendicular over Team Learning (left)
1’ deep on 1’ centers angled over Systems Thinking (center)
1’ deep on 1’ centers perpendicular over Shared Vision (right)
Team Learning

While Peter Senge identifies Systems Thinking as the “binding agent” which unifies the several disciplines into one functional theory, Team Learning is the discipline he identifies as actively generating new knowledge within the organization. As such, it is critical that Team Learning be facilitated effectively for the success of a Learning Organization, and this begins with its location. Team Learning has the highest correlation with Empowering Leadership and Systems Thinking, so providing readily accessible Team Learning space on all levels with Systems Thinking- and in immediate proximity to Empowering Leadership- supports the desired relationships of environmental variation and characteristic overlap (Figures 9, 12, & 15).

Furthermore, Team Learning is both inherently public-facing and almost covetously private. While organizations wish to display that they are actively generating new knowledge and invite the public to engage in and support that activity they also wish to maintain privacy of that information for their business purposes. To support both the privacy of information and the display of generating it, Team Learning facilities are pushed out into the public realm, cantilevered over the implied boundary of shared vision and the main building mass. This displays and celebrates the presence of Team Learning to the public while removing it vertically from their sight: ensuring the visual privacy of displays and activities from outside observers. This approach is complemented by the more dense array of fins depicted in Figures 7 & 8 and discussed in the previous section.

Finally, the design of the interior environment is highly engaged in celebrating the flexibility associated with diverse group needs and structures. Sliding, translucent partition walls allow space to be partitioned as needed for specific group sizes/activities/privacy levels. The overhead waffle grid curbs tapers in this area to curb ambient noise but not the spread of conversation within each space as it does in the Personal Mastery or Mental Models space where the slab is deeper. Ownership of space is low, as
partitions are flexible, minimal, and furniture is largely open and collaborative. Visual separation from
the hallways is provided by sheer curtains so that the details of one’s work may be obscured but the
presence and activity of Team Learning is still identifiable to those outside the room. Mid-to-soft tactile
quality is established by offsetting the rigid concrete structure exposed on the perimeter with acoustic-
deadening fabric of carpet and curtains, as well as the more comfortable tactile qualities of the provided
furniture. The furniture selection focuses on group-forming, with round tables and mobile chairs and
pin-up boards which serve as partitions (Figure 11). Ultimately, users are meant to be comfortable
spending extended duration in the generation of new knowledge, and the space in which this takes
place acts as a flexible and subtle backdrop to the activities inside. Once the learning is complete, the
team returns to apply and test it in the complex Systems Thinking environment.

Figure 9: Team Learning Massing
Figure 10: Team Learning Axonometric

Figure 11: Team Learning Perspective
Empowering Leadership

As an original discipline rather than one of Mr. Senge’s creation, Empowering Leadership builds on a system originally conceived as complete. It is thus reasonable that Empowering Leadership overlaps significantly with other disciplines in characteristics of space. Empowering Leadership shares greater than 50% of its spatial characteristics with Team Learning and Systems Thinking, which each share less than 50% with each other. This suggests that while Team Learning and Systems thinking may not take place in the same environment, Empowering Leadership takes place is both environments. However, this does not eliminate the need for designated Empowering Leadership environments, as we see that Empowering Leadership is actually negatively correlated with Empowering Leadership in a cross-matrix analysis.

To support the practice of Empowering Leadership, designated “Mentorship Rooms” are provided on both the lowermost and uppermost Systems Thinking levels. Located in proximity to Team Learning— the most highly correlated discipline— Empowering Leadership rooms function as quickly accessible, acoustically private retreat from the forum of Systems Thinking (Figure 12). These spaces-sized and furnished for two or three people each— feature a sliding partition wall that opens them up for larger, more group-oriented leadership activities or Team Learning options to take advantage of the similarity of space between Empowering Leadership and Team Learning.

The design of the Empowering Leadership rooms focuses on produces a welcoming, gentle atmosphere for conducting private conversation. In the course of doing business and managing people— especially in guiding them through the five other disciplines— difficult and personal conversations are sometimes necessary. That use case informs the features of these small rooms. Carpet flooring and cushions for seating contrast the hard-surface atmosphere of Systems Thinking and guide users into an informal spatial arrangement where leadership is focused on being transformative and relational, rather
than transactional and hierarchical. Wood paneling on the walls and draw-closed curtains provide a sense of comfortable isolation and protection while building on the high visual and acoustic privacy not afforded in other areas of the facility. An absence of outlets or monitors enforces the people-focus rather than technology-focus, and in the second-floor rooms a skylight to the Mental Models space provides a sense of openness and the high natural light which is ideal for this type of space (Figure 14).

Ultimately, Empowering Leadership is a discipline which will need to take place in a wide variety of contexts in order to guide small businesses through the process of building this systemic adoption of the other five disciplines and becoming true Learning Organizations. It is fair to say that of all the disciplines, Empowering Leadership could be the one for which a distinct physical environment is least necessary. However, such a conclusion would leave a key element of transformational leadership- interpersonal management- dramatically underserved and without a space with both the privacy and atmosphere to support the much-needed strategic conversations. The provision of specifically-designed personal conversation spaces facilitates the most difficult and sensitive practices of the leadership necessary to make all the other disciplines work, and is thus critical to the development of a Learning Organization facility.
Figure 13: Empowering Leadership Axonometric

Figure 14: Empowering Leadership Perspective
**Systems Thinking**

Systems Thinking is Senge’s pivotal component of *The Fifth Discipline*, and the largest component of both the theory and its physical space. Comprising the bulk of three floors, Systems Thinking is envisioned as the primary workplace of these design businesses - a highly collaborative "studio" environment. In fact, this design calls for a *Bürolandschaft* approach to the open space: the removal of prescribed regularity and linear elements in favor of self-organizing clusters of desks arranged as needed. To support this, an elevated floor of stone panels with frequent and regular power and data connections supports any conceivable configuration of desks and technology, while a waffle-grid of plywood fins conceals any shaping of space by the placement of light fixtures. Heating and Cooling are perimeter-distributed within the floor cavity as well, ensuring no inadvertent divisions of hot/cool spots from vents overhead. This open plan corresponds with the low visual privacy, large area size, high access to technology, high flexibility, and high natural light levels identified in our earlier analysis.

The furniture itself is intentionally irregular. Rather than prototypical rectangular forms which might lead users to form inward-facing, exclusive rows, all furniture is either angled or curvilinear with cut-outs for intersections and perceptual overlap between what is considered “personal” space (Figure 18). The intent is to reinforce that within a Systems Thinking environment there are no individual tasks, systems, or processes which are not dynamic and collective: a part of the larger system and the environment in which that system operates; effectively that there is exceptionally low ownership of space. The dynamism of this arrangement is enforced another way: by the storage rooms. On Friday of each week as each individual leaves, they are required to either take their laptop home, or to the lowest level to be securely stored (Figure 18). Then, all furniture is taken to the storage area on its floor, effectively clearing the Systems Thinking space to be re-assembled as needed at the start of work Monday morning. During the weekend, this newly vacated space becomes a community gathering
location: a place to build relationships with the larger systems outside the occupant businesses. Weekend classes from the University of Cincinnati, career training events, weekend maker-camps, and charrettes can be hosted in the Systems Thinking environments, building community awareness and engagement with the facility and its businesses.

This inter-relationship is further reflected in the mutual dependence each floor of Systems Thinking has with the others. The Glendora level is the only floor with access to the Makerspace, while the level above Vine Street has the only kitchen and dining areas. To make full use of the features of the facility, individuals must traverse between floors- thus being exposed to the larger system of the facility and the various disciplines and ideas at work. The physical space is also united by an atrium between the three levels along the south façade. This atrium allows the sound, smell, and vibrancy of activity from each floor to resonate with the others, so that at no point is one level truly independent or disconnected from the others. This atrium- in partnership with the absence of permanent, opaque partitions- contributes to the desired high acoustic transparency of the Systems Thinking Environment (Figure 17).

The end result of this Systems Thinking-focused portion of the facility is an environment even more open and dynamic that what we might consider the convention open-office plan. If this design were employed in isolation (as witnessed in the Chiat/Day experiment or as we see with “mobile desk-sharing” initiatives today) it would almost certainly lead to higher employee dissatisfaction and loss of productivity. This is why most open-office plans compromise on the characteristics expressed here. However, as one of six types of space available in the facility, this design can function in such a specialized role- supporting the integration of highly dynamic systems-focused collaboration and innovation. While the users may retreat to disparate environments around the facility for their specific and temporary individual or group-based needs, the shared vision space will always bring them back here- the place of understanding how their work integrates with the larger systems and community around them.
Figure 15: Systems Thinking Massing - in Red

Figure 16: Axonometric of Systems Thinking Areas
Figure 167: Systems Thinking Atrium

Figure 18: Floor Plan- Level: Vine St.
In direct contrast to the low-ownership, high-transparency mentality of the Systems Thinking environment, Personal Mastery is the space of isolation and retreat for those tasks which require focus not afforded by the open-office plan. This discipline is private, sequestered from the public by being elevated and stepped back from the louder, more public environments (Figure 19), and by the circuitous, low-ceilinged hallways required to transition from the Shared Vision stair to the Personal Mastery desks (Figure 22).

After passing through the transition corridors, the Personal Mastery environment is a highly structured, partitioned set of small rooms and tabletops. The flooring transitions to acoustically absorbent carpet, the ceiling fins deepen to isolate and absorb sound, and while each desk has a view to the exterior, very few workstations have overlapping fields of view of each other. The enclosed rooms have privacy curtains, and the desks are visually separated by tack- and dry-erase boards. Additional monitors connect to the user’s laptop to support the access to technology needed for efficient productivity, but the environment does not offer the plethora of electrical and data connections that would encourage flexible use of space- which would serve only to distract other users. The exception to this flexibility restriction is in the enclosed multi-user rooms. In these spaces, worktops and seating are actively configurable for an atypical work function, like using the surrounding translucent glass walls as whiteboards.

The end result of this highly isolated environment is a high-ownership, quiet, private, rigid facility where users are encouraged to retreat to for the time needed to complete a specific, intensive task before returning to the Systems Thinking work zone (Figures 20 & 21). Customization is strictly limited to supporting optimal task performance and adjusting levels of privacy, even at the expense of
some measure of comfort. This is because the Personal Mastery space is not intended to become the primary workstation of any individual: their Systems Thinking workstation fills that capacity. This honors Senge’s determination that Systems Thinking is the discipline which unites the others and converts an organization which learns into a Learning Organization supported by Personal Mastery.
Figure 18: Personal Mastery Room Perspective
Figure 19: Floor Plan - Level 2

Access/Buffer Corridors

Personal Mastery Workstations
Mental Models

The most private and introspective of the six disciplines, Mental Models retreat furthest from the public to the uppermost floor before cascading to shelter and share the level of Personal Mastery (Figure 23). The prototype for this space is the reflection garden- though its interior elements draw from such meditative influences as modern yoga studios and religious spaces- and it uses biophilia and the elevated views above surrounding buildings to create a sense of freedom and seclusion.

The two enclosed studios look out into a courtyard of planters and extensive green roof. The studios offer a flexible array of sensory-malleable furniture options such as yoga mats, oversized cushions, bean-bag chairs, and Eames chairs. These furniture options are flexible in the space and can be partitioned with bamboo or translucent screens for privacy and establishing ownership of space. To avoid distractions there are no connections for electronic devices, and users are provided with space to leave their devices behind upon arriving.

Outside the studios, users have a variety of private, reflective spaces available to get comfortable away from distraction and contemplate. Abstract art, running water, batten screens, and planters create visual and acoustic privacy and provide users with a gentle backdrop to their thoughts. Ultimately, the Mental Models environment strives uses a unique furniture palate and use of nature to remove the user from their experience of being in the workplace. By enhancing the sensation of enjoying a private garden retreat, users are able to remove themselves from the pressures and concerns of their employment and reflect on themselves and their workplace experiences to better understand how they fit into the changing, learning organization (Figure 25).
Figure 20: Mental Models Massing - in red

Figure 24: Mental Models Axonometric
Figure 25: Mental Models Perspective
Summary

Learning Organization theory is fundamentally poly-centric: its core premise is that sustained, systemic learning depends on all the disciplines taking place in unison, in perpetuity. While Systems Thinking is heralded as the breakthrough foundation which unites the others into a cohesive system and is thus expressed as the primary work environment- without the other disparate systems no amount of systemic awareness can produce sustainable progress. The same is true for all the other disciplines, though perhaps they serve a supplementary role, each with their nuances and inter-relationships. The expression of all these systems in one space leads to a far more complex result than perhaps initially expected, as is evidenced by the unified axonometric drawing in Figure 26. While each of the previous axonometric drawings makes clear and intuitive sense, when combined they produce an overwhelming mixture of visual stimuli with no real hierarchy. This result is subdued once clad again in the façade (Figure 27), but this chaos is perhaps the greatest indication of a successful expression of *The Fifth Discipline* in physical form. Like Senge’s initial work, we see an absence of hierarchy (his initial theory called for the removal of organizational hierarchy) in favor of several systems overlapping at once. Navigating the space requires an understanding of each environment and its purpose, in itself facilitating awareness of the greater system. By ignoring typical office conventions (amenities on every level, one office space for all uses, etc) this design celebrates forces users to circulate, to discover, to engage with their environment in a poly-natured experience of learning and change while surrounded by like-minded professionals who can help expand their scopes of knowledge and understanding.
Figure 226: All Disciplines Axonometric - Without Envelope

Figure 2721: All Disciplines Axonometric - With Envelope
Figure 238: Southeast Corner Perspective
Conclusion and Opportunities for Future Research

Facilitating learning in the workplace is has been the subject of incredible experimentation in recent history, as organizations like Google (now Alphabet) champion causes like the “10% rule,” where employees are required to spend 10% of their working time learning and testing new ideas. In a world where a company starts as an online bookstore (Amazon) and grows to become the largest cloud services provider in the country (as well as the retailer of original video content and hardware), one could argue that innovation has effectively become a business model.

It is in this context that a facility which serves to facilitate learning and innovative knowledge creation is perhaps more timely and appropriate than ever before. Building first on the theory of Learning Organizations to reflect recent scholarship and then on the disciplines of this expanded theory as a model for the physical environment, the Design, Learn, Repeat Business Incubator unites all the disparate elements necessary for systemic learning practices.

By identifying not only the ideal characteristics of each discipline but also the overlap they share with each other and the measure by which they fluctuate in correlation to each other, the organization and design of space takes on a processional nature which celebrates the diversity of experiences. It is in this analysis that we discover just how diverse the needs of a single workplace can be, and perhaps the fallacy of contemporary concepts which seek to find an all-purpose solution but which inevitably prove incapable of serving even any discipline successfully- as it must inherently compromise the characteristics desired in attempt to serve other disciplines simultaneously. The Bürolandschaft of the Systems Thinking space is incompatible with the rigid task-orientation of Personal Mastery, much less the quiet, private contemplation of Mental Models.
However, this research and design is by no means a conclusion. The implementation of even identical values and theory on a different site with a different program would inevitably yield entirely different, engaging possibilities for expressing the disciplines and the relationships between them. However, even the values associated with each discipline are subject to question and reinterpretation according to a different reading of Senge’s literature. The “sixth discipline” of Empowering Leadership could be called into question: is it necessary, or does it need revision and redefinition according to new developments in leadership theory? Perhaps the twelve identified metrics of spatial characteristics should be substituted for others, added to, or consolidated. Each of these reinterpretations opens opportunities to enhance the body of knowledge around Learning Organizations and how the physical environment can support them.
Design for Competitive Advantage: Facilitating the Learning Organization

1965 1976

Stegmeier's Critical Influence Factors for Effective Work Environments

- **Goals & Values**
  - **Technology**
    - **Business Processes**
      - **Knowledge Management**
        - **Mission & Vision**
          - **rewards & Consequences**

**Mental Models**

- **Personal Mastery**
  - **Inter-Personal Knowledge Transfer**
    - **Systems Thinking**
      - **Inter-Personal Knowledge Transfer**
        - **organizational innovation.**

Researchers empirically link organizational learning and innovation, where organizational learning is the process of changing these mental models.
Bibliography


