



The Impact of Architectural Privacy Features on Performance, Stress and Informal Learning: Phase III Study

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The Phase III study examined the impact of a broad range of design features on performance, stress, and informal learning. The study determined that only certain design features directly enhanced performance. Others were found to directly support stress reduction or informal learning which indirectly supported performance. Some of these features also supported individual or group privacy as well as the ability of people to communicate and collaborate and to perform their basic job functions.

Project Overview

Few decisions made by today's organizations are as highly visible, as expensive, and as long lasting as the decisions made about physical facilities (O'Mara, 1999). In seeking the ideal design for today's workplace, designers are confronted with two deeply divided research camps. The first group argues for a return to private offices and the other promotes the open office: "We have watched the physical environment go from private to open offices. But it doesn't increase interaction and doesn't make for an open organization" (Brill cited in Grossman, 2002, p. 40). The other camp argues that open offices increase communication and collaboration: "Usually, you can't see the person in the cube next to you unless you stand up...In a survey of 2,000 employees, we found that the likelihood that you'll have contact outside your group dramatically decreases when you have a private office" (Becker cited in Grossman, 2002, p. 39).

Both arguments have merit but provide only a partial solution. Privacy studies completed in conjunction with Haworth, Inc. in 2005 determined that a three-pronged design solution that provides for a proportionate balance of privacy, communication, and collaboration, as well as the ability to complete basic job functions (such as having an adequate worksurface to spread out work), appears to be the ideal design for

today's workplace (Kupritz & Haworth, Inc., 2005). These privacy studies also determined that design needs for this balance can vary by job type.

What is it about providing private offices or open offices that creates the most productive environment? Implicit in the open-versus-closed office debate is the assumption that all design features that support communication and collaboration or privacy also enhance performance.

The missing link in the debate is identifying the specific design features that provide optimum job performance — be they related to privacy, communication and collaboration, a combination of both, or the ability to complete basic job functions. Identifying these crucial design features provides organizations with a better ability to differentiate features that provide optimum performance from those with marginal benefit to performance. This focus gives organizations the best opportunity to maximize their return on investment for physical facilities and their properties.

As part of the privacy studies completed in conjunction with Haworth (Kupritz & Haworth, Inc., 2005), this study, further addressed the shortcomings of the open-versus-closed office debate by examining the impact of a broad range of design features on performance, stress and informal learning that support privacy, communication and collaboration, and basic job functions. The Phase III study primarily focused on how design features affected performance (specifically, keeping up with fast-paced work, reducing work delays, and reducing work errors). However, it also included the impact these features had on stress and informal learning because of their indirect linkages to performance (see for example, De Croon, Sluiter, Paul, Kuijer, & Frings-Dresen, 2005; Bencivenga, 1998; and Brill, Weidemann, & BOSTI Associates, 2001).

Participants. The Phase III study further examined data collected from the privacy studies completed in 2005 in conjunction with Haworth at a large Midwestern manufacturer. The data pertained to performance, stress, and informal learning across four job types: business professionals, technical professionals, managers, and administrative support services. These job types were selected because of their broad relevance to organizations at large. The job types reflect a taxonomy which identifies workstyles as being concentrative/collaborative, concentrative/technical, consultative, and transactional:

- Business professionals consisted of marketing and sales, human resources, accounting and finance, purchasing, and customer service professionals that support the infrastructure of the organization.
- Technical professionals consisted of engineers, computer systems engineers, engineering designers, and industrial engineers that support information systems and engineering.
- Managers hold lead positions and supervise and evaluate direct reports for the work functions that support the company's business activities.
- Administrative support services personnel consisted of workers who provide administrative support including reporting business functions of a routine or recurring nature; managing and archiving paper work, electronic data, and people's schedules; transcribing and entering data; and coordinating and collaborating with work groups to help them achieve their goals.

Procedures. Utilizing an ethnographic approach, 248 office workers participated in the privacy studies. In Phase I, 48 office workers across the four job types were interviewed for approximately one hour each. This provided a macro examination of cultural knowledge about perceived privacy and collaboration needs from which a questionnaire was built to use in Phases II and III. The questionnaire was designed to measure positive and negative relationships between a broad range of office design features and work activities, and to prioritize where privacy fits into what is important to office workers for performing work. In Phases II and III, 200 office workers across the same four job types completed the survey questionnaire. Both phases had a 100 percent response rate. The questionnaire consisted of 329 questions that generated 65,800 responses, reflecting its depth.

Concept of Privacy. Privacy is the regulation of interaction between the self, others, and environmental stimuli, which is a dynamic, boundary-regulating process that changes depending upon the particular situation and circumstances at the time (Kupritz, 2000). While architectural privacy is most commonly associated with visual and acoustical isolation (Sundstrom, Burt, & Kamp, 1980), it also involves olfactory and tactile isolation supplied by the physical environment. For example, the physical environment can provide olfactory isolation from unwanted environmental smells such as cigarette smoke or food smells originating from a dining or break area. The physical environment can also provide tactile isolation from uncomfortable HVAC conditions and fluctuating temperatures in a workspace (Kupritz & Haworth, Inc., 2005).

Findings

As explained earlier, the open-versus-closed office debate implicitly assumes that all design features that support communication and collaboration or privacy also enhance job performance. The Phase III study determined that only certain design features enhanced performance. Others were found to directly support stress reduction or informal learning, which indirectly supported performance. It also found that some of these features supported individual or group privacy as well as the ability of people to communicate and collaborate and to perform their basic job functions. Participants in the study also ranked the design features that impacted performance, stress, and informal learning as important features for them to do their jobs. However, job types did not always give these features the same rank of importance. The following discussion provides more detail on these findings.

1. Not all of the design features that support privacy or communication and collaboration in this study supported performance. Workers

across job types strongly agreed that these design features did not support the following performance activities -- keeping up with fast-paced work, reducing work delays, and reducing work errors:

- Having a larger personal office
- Having a personal workspace with 50"-high panels
- Having a personal workspace with floor-to-ceiling solid walls
- Having a door to close
- Having informal meeting areas, including break areas
- Having a collaborative area for group work with no panels or walls
- Having a collaborative area for group work with 50"-high panels

Even though workers did not perceive that all of the above features supported performance, some job types agreed that two of the features that supported communication and collaboration also supported stress reduction or informal learning. For example, technical professionals strongly agreed that "having a personal workspace with 50"-high panels" supported informal learning but not performance. Administrative support services and business professionals strongly agreed that "having informal meeting areas, including break areas" supported stress reduction, and Administrative support services and managers strongly agreed that this same design feature supported informal learning, but none of the job types felt that they supported performance.

The finding suggests that these two collaborative design features ("having a personal workspace with 50"-high panels" and "having informal meeting areas, including break areas") may serve different design roles in enabling work

processes other than keeping up with fast-paced work, reducing work delays, and reducing work errors. The different roles mean that these two features may not directly support performance but may indirectly support it through stress reduction or informal learning.

Organizations should not infer that this finding applies to all work settings as it may depend upon the relevancy to the particular work situation and circumstances. Prior research in a service industry involving workers with supervisory skills ranked design barriers such as enclosing the personal workspace in floor-to-ceiling solid walls high in importance for older workers performing multiple privacy activities whereas workers in the present study ranked this design barrier low in importance (Kupritz, 2003a, 2003b). While the Kupritz study (2003a, 2003b) did not measure performance activities, the study indicates that variance may exist in different work settings and points to the importance of relevancy.

2. Certain design features that support privacy, communication and collaboration, or basic job functions in this study also support performance and stress reduction. Workers across job types strongly agreed that these features supported multiple performance activities and stress reduction in most instances:

- Having sufficient lighting and controls
- Having sufficient temperature/ventilation/air conditioning and controls
- Having flexible furniture and equipment that can be rearranged to fit work needs
- Having a sufficient worksurface to spread out work
- Having sufficient office equipment/reference materials/

supplies and easy access to them

- Having my personal workspace facing away from foot traffic
- Having my personal workspace located away from high foot traffic aisles
- Having coworkers who work together located close together

These eight features appear to serve multiple roles in enabling work processes. So their design role in reducing stress may help buffer the negative impact of environmental stressors for office workers at this large Midwestern manufacturer.

Prior research has documented that worker ability to control air quality, lighting, and thermal conditions in the workspace impacts worker health and performance (see the review by Hedge, 2000; also Burge, 2004; Kolstad, Brauer, Iversen, Sigsgaard, & Mikkelsen, 2002; Menzies & Bourbeau, 1997; & Vasmatazidis, Schlegel, & Hancock, 2002). Further, Kroner, Stark-Martin, and Willemain (1992) determined that personal control over environmentally responsive workstations increased worker productivity by two percent.

“Having flexible furniture and equipment that can be rearranged to fit work needs, a sufficient worksurface to spread out work, sufficient office equipment, reference materials, and supplies and easy access to them” support basic job functions. Providing flexible environments that accommodate workers' ability to manipulate physical attributes such as furniture and equipment is far more important than originally thought. O'Neill and Evans (2000) determined that worker control over the physical environment — both actual and perceived — can enhance physical health and offset the stressing effects of heavy workloads and a fast work pace.

“Having my personal workspace facing away from foot traffic” and “having my personal workspace located away from high foot traffic aisles” are architectural privacy features that

deal with orientation or positioning and distance from traffic for design layout. The office workers in this study strongly agreed that the collaborative design feature, “having coworkers who work together located close together,” supported multiple performance activities. Only managers, however, strongly agreed that this design feature supported stress reduction.

3. The majority of the design features ranked highest in importance by workers across job types in this study support multiple performance activities and stress reduction. They also support privacy, communication and collaboration, or completing basic job functions. This finding suggests that office workers generally give higher importance to design features that maximize their opportunity to perform and reduce stress as well as support privacy, communication and collaboration, or their ability to complete their basic job functions.

Those design features with the highest importance rankings per job type were those that support both performance and stress reduction as well as privacy, communication and collaboration, or basic job functions. For example, certain architectural privacy features, “having my personal workspace located away from foot traffic” and “having my personal workspace facing away from high foot traffic aisles,” were ranked in the top four to seven design features across job types. Workers across job types strongly agreed that both of these design features supported reducing work delays, work errors, and stress. (Administrative support services and business professionals strongly agreed that these design features supported keeping up with fast-paced work as well.) Workers across job types also strongly agreed that these two design features supported multiple privacy activities (Kupritz & Haworth, Inc. 2005). Prior research in a manufacturing industry (Kupritz, 1998) as well as a service industry (Kupritz, 2003a, 2003b) determined similar findings.

Certain design features that support basic job functions — “having flexible furniture and equipment that can be rearranged to fit work needs” and “having a sufficient worksurface to spread out work” — were ranked in the top eight design features across job types. Workers across job types strongly agreed that both of these design features supported keeping up with fast-paced work and reducing work delays, work errors, and stress. Three of the four job types strongly agreed that “having flexible furniture and equipment that can be rearranged to fit work needs” related to the privacy activity, concentrating. All job types strongly agreed that “having a sufficient worksurface to spread out work,” related to this same privacy activity, concentrating (Kupritz & Haworth, Inc., 2005). The collaborative design feature, “having coworkers who work together located close together,” was ranked in the top six design features across job types and appeared to be the most important collaborative design feature for the office workers at this large Midwestern manufacturer. Workers across job types strongly agreed that this design feature supported keeping up with fast-paced work and reducing work delays. Three of the four job types also agreed that this feature supported reducing work errors. The office workers participating in this study strongly agreed that this design feature was not related to multiple privacy activities (Kupritz & Haworth, Inc., 2005).

4. Workers across job types did not consistently give those design features that support performance in this study the same individual rank of importance. Workers across job types perceived similar positive and negative relationships between

design features and performance activities in many instances. However, workers did not perceive similar weightings of importance for most of these features. This finding suggests that providing a generic template of design features for all job types may not enhance performance across the board.

For three of the 21 design features, though, workers across job types were consistent with each other in their priority rankings and strongly agreed that these three features supported performance and stress reduction, as well as privacy, communication and collaboration, or basic job functions. They were:

- Having coworkers who work together located close together
- Having my personal workspace facing away from foot traffic
- Having my personal workspace located away from high foot traffic aisles

Thus, organizations should target the most critical design needs that job types share in common as well as provide for differences among job types to maximize worker ability to perform.

5. Workers do not consistently agree about which design features support informal learning in this study. Workers varied by job type in their perceptions about which design features supported informal learning. For example, “having coworkers who work together located close together” was the only feature out of the following nine design features positively related to informal learning on which workers across job types strongly agreed. Those nine design features are:

- Having sufficient temperature/ventilation/ air conditioning and controls
- Having a personal workspace with 50"-high panels
- Having a personal workspace with 64" or 68"-high panels
- Having informal meeting areas, including break areas
- Having a conference room available when needed
- Having flexible furniture and equipment that can be rearranged to fit work needs
- Having a sufficient worksurface to spread out work
- Having sufficient office equipment/reference materials/supplies and easy access to them
- Having coworkers who work together located close together

Job types varied in their perceptions for the other eight features. For example, technical professionals strongly agreed that “having a personal workspace with 50"-high panels” supported informal learning whereas business professionals strongly agreed that “having a conference room available when needed” supported informal learning.

Administrative support services and managers were the only two job types to agree that “having informal meeting areas, including break areas” supported informal learning. (Administrative support services and business professionals were the only two job types to agree that this feature also supported stress reduction.) Another study determined that a dining break area encouraged informal learning but did not differentiate between job

types (Bencivenga, 1998). It may be that “having informal meeting areas, including break areas” supports informal learning for certain job types and work settings.

Managers perceived the most opportunities for certain design features to support informal learning. For example, this was the only job type to agree that these features supported informal learning: “having sufficient temperature/ventilation/air conditioning and controls, a personal workspace with 64” or 68”-high panels, a sufficient worksurface to spread out work, and sufficient office equipment/reference materials/supplies and easy access to them.”

Research indicates that as much as 70 to 87 percent of organizational learning occurs through informal learning (Bencivenga, 1998; Brill et al., 2001). Brill et al. (2001) proposed that workplace design may play a large role in impacting informal learning, but the present finding suggests that design solutions should accommodate differences among job types to support informal learning opportunities.

6. Workers generally agree about which design features support stress reduction in this study. Workers strongly agreed that 13 design features supported stress reduction. All four job types strongly agreed that eight of these 13 design features supported stress reduction in most instances. These design features supported performance, privacy, communication and collaboration, or basic job functions as well. (See Finding 2.)

The office workers in this study also strongly agreed that “having a window to see natural daylight and views outside the building” supported stress reduction but did

not support privacy, communication and collaboration, basic job functions, or performance. Prior research supports this finding. Leather, Pyrgas, Beale, and Lawrence (1998) determined that external views of natural settings helped buffer the negative impact of job stress. Further, Stone (1998) and Stone and Irvine (1993) found that the presence of windows did not affect performance but appeared to support job task demand.

The need for stress reduction in the workplace has long been documented. Consistent evidence exists that long-term reactions to environmental stressors such as noise and distractions include decreased performance (Banbury & Berry, 1997, 1998; Cotton & Hart, 2003) and negative health consequences such as chronic fatigue, burnout, and musculoskeletal disorders (De Lange, Taris, Kompier, Houtman, & Bongers, 2002; Sluiter, De Croon, Meijman, & Frings-Dresen, 2003). Indeed, Zijlstra, Roe, Leonora, and Krediet (1999) determined that the effects of interruptions reach beyond work task execution and the change of work strategies, and appear to influence the worker’s subsequent readiness to perform (see also Evans & Johnson, 2000 regarding motivational deficits). On the positive side, Raffaello and Maas (2002) determined that improved noise conditions increased job and environmental satisfaction and reduced stress symptoms.

Conclusion

The open-versus-closed office debate has presented a one-dimensional argument to designers that a design solution supporting communication and collaboration or one that supports privacy will provide the most productive environment for today’s workforce. In reality, privacy, communication, and collaboration needs

in the workplace are multidimensional and do not fit neatly into either design solution. The Phase III study addressed the missing link in the open-versus-closed office debate by identifying the specific design features that appear to provide the most productive environment for office workers at a large Midwestern manufacturer.

The study determined that certain design features that enhanced performance across job types were a combination of features that supported privacy, communication and collaboration, or basic job functions. These same features also supported stress reduction in most instances. The majority of these features were ranked highest in importance per job type even though many had different individual rankings of importance. Further, only certain design features appeared to directly support performance. Others were found to directly support stress reduction or informal learning which resulted in them indirectly supporting performance.

The findings of this study enhance an organization’s ability to differentiate design features that appear to provide optimum performance from those with only marginal benefit. This focus gives organizations the best opportunity to maximize their return on investment for the design and layout of their physical facilities. Although the job types represented in this study were selected because of their broad relevance to organizations at large, organizations should not infer that these findings apply to all work settings. It may depend instead upon the relevancy to the particular work situation and circumstances. The findings, however, begin the process of determining the specific design features that enhance performance across job types.

References

- Banbury, S., & Berry, D.C., (1997). Habituation and dishabituation to speech and office noise. *Journal of Experimental Psychology: Applied*, 3(3), 181-195.
- Banbury, S., & Berry, D.C. (1998). Disruption of office-related tasks by speech and office noise. *British Journal of Psychology*, 89, 499-517.
- Bencivenga, D. (March, 1998). A humanistic approach to space. *HR Magazine*.
- Brill, M., Weidemann, S., & BOSTI Associates (2001). *Disproving widespread myths about workplace design*. Jasper, IN: Kimball International.
- Burge, P.S. (2004) Sick building syndrome. *Occupational and Environmental Medicine*, 61, 185-190.
- Cotton, P., & Hart, P.M. (2003). Occupational wellbeing and performance: A review of organizational health research. *Australian Psychologist*, 38, 118-127.
- De Croon, E.M., Sluiter, J.K., Kuijjer, P. Paul, F.M., Frings-Dresen, M.H.W. (2005). The effect of office concepts on worker health and performance: A systematic review of literature. *Ergonomics*, 48(2), 119-134.
- De Lang, A.H., Taris, T.W., Kompier, M.A.J., Houtman, I.L.D., & Bongers, P.M. (2002). Effects of stable and changing demand-control histories on worker health. *Scandinavian Journal of Work Environment and Health*, 28, 94-108.
- Evans, G. W., & Johnson, D. (2000). Stress and open office noise. *Journal of Applied Psychology*, 85(5), 779- 783.
- Grossman, R.J. (September, 2002). Offices versus open space. *HR Magazine*, 36-40.
- Hedge, A. (2000). Where are we in understanding the effects of where we are? *Ergonomics*, 43(7), 1019- 1029.
- Kolstad, H.A., Brauer, C., Iversen, M., Sigsgaard, T., & Mikkelsen, S. (2002). Do indoor molds in non-industrial environments threaten workers' health? A review of the epidemiologic evidence. *Epidemiologic Reviews*, 24, 203-217.
- Kroner, W. M., Stark-Martin, J., & Willemain, T. (1992). *The West Bend Mutual Study*. (Troy: Center for Architectural Research, School of Architecture, Rensselaer Polytechnic Institute).
- Kupritz, V.W. (1998). Privacy in the workplace: The impact of building design. *Journal of Environmental Psychology*, 18, 341-356.
- Kupritz, V.W. (2000). Privacy management at work: A conceptual model. *Journal of Architectural and Planning Research*, 17(1), 47-63.
- Kupritz, V.W. (2003a). Accommodating privacy to facilitate new ways of working. *Journal of Architectural and Planning Research*, 20(2), 122-135.
- Kupritz, V.W. (2003b). The effects of physical design on routine work activities. *Journal of Architectural and Planning Research*, 20(2), 110-121.
- Kupritz, V.W., & Haworth, Inc. (2005). *Ethnographic assessment of individual and group privacy needs: Phase I and II Studies*. Haworth research paper.
- Leather, P., Pyrgas, M., Beale, D., & Lawrence, C. (1998). Windows in the workplace: Sunlight, view, and occupational stress. *Environment and Behavior*, 30(6), 739-762.
- Menzies, D., & Bourbeau, J. (1997). Building-related illnesses. *New England Journal of Medicine*, 20, 1524- 1531.
- O'Mara, M. A. (1999). Strategy and place: Managing corporate real estate and facilities for competitive advantage. New York: Free Press.
- O'Neill, M. J., & Evans, G. (2000). Effects of workstation adjustability and training on stress and motivational performance. *Proceedings of the 31st Annual Conference on the Environmental Design Research Association*, (pp. 60-66), Edmund, OK: Environmental Design Research Association.
- Raffaello, M., & Maas, A. (2002). Chronic exposure to noise in industry. *Environment and Behavior*, 34(5), 651-671.
- Sluiter, J.K, De Croon, E.M., Meijman, T.F., & Frings-Dresen, M.H.W. (2003). Need for recovery from work related fatigue and its role in the development and prediction of subjective health complaints. *Occupational and Environmental Medicine*, 60, 62i-70i.