Insight to the point

Acoustic Comfort in the Workplace: Getting Back to the Basics

Those of us who regularly work in an office environment have likely lived through several periods of change in our job functions and especially in the tools and practices we use to do our work. But has the office environment kept up with those changes; and with each change, is it still optimally designed to help us get our work done? The goal of this paper is to review how work processes are continuing to change, and the direction that workplace design must take to keep up now and into the future. With the speed of change ever increasing, “form (still) follows function” but requires us to thoughtfully plan not only for today’s requirements but how space can adapt to whatever comes next.

Is there any doubt there’s a problem?

More and more attention these days is being paid to the problem of noise in the office. Love it or hate it, even mainstream media has gotten into the act: ABC News posted an article in July of 2013 entitled “Proof that Open Plan Offices Are Satan’s Handiwork,” decrying the dysfunctional aspects of open plan workplaces.

But, before we over-react, throw the baby out with the bathwater, and go back to a maze of private offices, let’s remember that good workplace design is not an accident or superficially developed. Rather, it’s the result of the thoughtful integration of work practices and the physical environment. The end result, when successfully completed, is a blend of architectural and furniture-supported settings designed to enable varying work processes while contributing to the well-being of the occupants. This includes providing appropriate acoustic elements throughout the workplace.

Unfortunately, as we’ve pushed to improve the efficiency of the workplace, usually resulting in fewer square feet per person, we frequently lose sight of ensuring that individuals can work effectively; one aspect of which is “acoustic comfort.”

Results in the post-occupancy surveys of buildings conducted by the University of California Center for the Built Environment (CBE) have consistently shown, as seen in Figure 1, that the acoustic quality in office buildings in the U.S. (or the lack thereof) is the single factor that elicits disapproval from occupants, in both non-rated and LEED®-rated office buildings.

Figure 1. POE survey results for 21,481 building occupants and 4,788 green building occupants.
To state this notion even more simply, while efficiency is an important goal, worker effectiveness is even more important. And it has much value to the organization.

For most organizations, a 5% increase in revenue is a much bigger number than a 50% decrease in real estate costs. This opportunity to shift our focus to what adds the most value to the organization is reinforced by Figure 2, where workplace real estate costs are easily eclipsed by the costs associated with the workforce; and by recent findings from the 2013 Gensler Workplace Survey, shown in Figure 3. Their findings indicate that occupants are struggling to work effectively, effective workplaces must balance between focused work and collaboration, and architectural and operational choices drive performance and innovation.

The newest version of the U.S. Green Building Council’s (USGBC) LEED program – LEED v4 – has also recognized this issue by including a new credit for acoustics in the requirements for LEED Interior Design and Construction (ID&C), shown in Table 1. These new requirements offer a more holistic approach which looks at the total impact on human users. Some of the requirements for daylight and views have also been revised – which together could impact the overall acoustic performance of the workspace.

So while we might get annoyed at the overly dramatic headline ABC News used, they’re not wrong to call attention to a very real issue.

| Credit | Daylight | • Credit title renamed from “Daylight and Views” to “Daylight”.
|        |          | • Removed prescriptive option.
|        |          | • Added option for spatial daylight autonomy.
|        |          | • Changed units from footcandles to lux.
|        |          | • Added a timing requirement to measurement option.
| Credit | Quality Views | • Credit title renamed from “Daylight and Views” to “Quality Views.”
|        |          | • Added requirement for quality view, defined by the LEED 2009 exemplary performance criteria.
|        |          | • Added provisions for interior atria.
| Credit | Acoustic Performance | • New credit.
|        |          | • Added requirement for room noise levels, speech privacy and sound isolation, reverberation time, and paging, masking, and sound reinforcement systems.
|        |          | • Harmonized ANSI and ASHRAE standards.

Table 1. LEED v4 updates.
Our hope in co-authoring this paper is to strongly encourage the investment of time and energy into addressing the problems of noise and speech distractions – which means following proven principles that address speech intelligibility and concentration within spaces, and speech privacy and annoyance or distraction between spaces.

**Fundamental guiding principles are still relevant**

Simply said, we should focus both on good planning and on the thoughtful application of architectural elements to provide the acoustical performance needed to support the range and types of work being done.

“Zoning” is a key consideration during planning – and as we consider key adjacencies between workers and work activities, we should also explore the spatial impact of zoning on acoustic comfort. An “Interaction Area” where loud, noise-generating activities can be clustered should be segregated – away from a “Focus Area” that supports individual activities that require focus and concentration. And these spaces need to be segregated from those that support very private, confidential, or personal work and conversations – a “Privacy Area.”

Within each zone or setting, then, choosing and designing architectural elements and materials to control acoustic outcomes is relatively straightforward. It’s helpful to keep in mind the “ABC” model of acoustic design:

- “A” stands for sound absorptive materials which can be used to control the amount of reflected sound within a room, like certain ceiling and wall treatments, and absorptive surfaces on furniture.
- “B” stands for sound blocking (“transmission loss” – a good thing) between spaces.
- “C” refers to the ability of background noise and specifically electronic sound masking to cover intruding noises such as speech within a space so that it is either not intelligible or even audible to unintended listeners.

Armstrong Commercial Ceilings and Wall Systems has several excellent papers that explain and recommend approaches to these three strategies in more detail, including “Working by Design” and “Rx for Improving Patient Outcomes.”

Allsteel thinks it’s important to add another letter to the ABC model above: “D” for drive new behaviors with design, protocols, and group norms that encourage situationally appropriate actions. These may be as simple as not using speakerphones in open spaces or an agreement to move conversation longer than 2 or 3 minutes to an “Interaction Space.” It may take time for norms to be established, but they will help users to get the most from their workspace. The best laid plans and
designs will fail if behaviors aren’t consistent with the intentions for the space.

**New ways of working make all this even more relevant**

Not all that long ago, a typical floor plan used 80% of its square footage on offices and workstations – “I” spaces. The other 20% – the “We” spaces – usually took the form of enclosed conference rooms of various sizes, and a break room and copy room. More recently, we’ve seen the most progressive organizations shifting to closer to a 50/50 split between “I” and “We,” with many new types of group workspaces to better support the variety of activities that make up work these days.

All these new kinds of spaces or settings – even the enclosed ones – add to the complexity of getting the acoustics right. And they force us to reconsider the cues that help set expectations of how one might expect a given setting to perform. A lot of early experimentation with this expanded set of spaces proved that we don’t always get these things right, including the noise issues. One final consideration: we must also anticipate the need for settings to be agile and able to quickly adapt over time to inevitable change.

Allsteel is adding one final letter to our ABCD model: “E” for evolve. That suggests that some of our acoustic solutions be adjustable (like sound masking that allows us to set different levels of volume in each space) or moveable/relocate-able. These might include furniture components like screens, moveable walls, acoustic panels, or other components that help to absorb sound. Relocate-able walls can both effectively absorb and block sound, while being easily and quickly moved or reconfigured. Other products, like absorptive panels, clouds, and baffles can be moved from one location to another with ease.

As we create a range of new work settings in response to different drivers and requirements, the thoughtful planning and provisioning of space – including situationally specific acoustical design – becomes even more critical not only to support new work process but also to ensure these new settings are places to work effectively.
References


2 Panel discussion presentation “Improving the Indoor Experience” at UC Berkeley, CBE Spring Meeting 24 April 2014

3 Disproving Widespread Myths about Workplace Design, BOSTI Associates, 2001


Workplace Advisory at Allsteel

The Workplace Advisory team listens. And we apply research and our extensive workplace experiences and insights to assist organizations develop and implement a situationally appropriate workplace strategy: one that aligns with their organizational culture and business goals, supports their workers’ ability to work effectively, utilizes their real estate assets as efficiently as possible, and is highly adaptable to changing business and work practice requirements.

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The INSIGHT mark identifies material – papers, presentations, courses – created specifically by the Workplace Advisory team to share our workplace strategy knowledge and perspective. Additional INSIGHT material may be found at allsteeloffice.com.

About Jan Johnson, Co-Author
Jan Johnson, FIIDA, VP of Design and Workplace Resources at Allsteel and is a highly respected workplace strategist. She leads the Workplace Advisory team to provide insights and project support to Allsteel customers. Jan and team contribute to setting Allsteel’s annual research agenda and to interpreting Allsteel’s and others’ findings into a rolling three-year product development strategy, and are actively involved in the development of each new product. Jan frequently writes and speaks about workplace topics. She was co-chair of IIDA’s Knowledge Center during its development and currently serves on the Council for Interior Design Accreditation board and on the Knowledge Advisory Panel for CoreNet Global’s Workplace Community. She has taught courses in CoreNet Global’s Master of Corporate Real Estate (MCR) program since 2009 and recently helped develop the core competencies that define workplace strategy and the related content for CoreNet Global’s three new MCRw courses.

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Dr. Kenneth P. Roy, PhD, FASA, is senior principal research scientist at Armstrong World Industries, and responsible for acoustic technologies worldwide at Armstrong’s Innovation Center; where he is involved in extensive research and teaching programs, and international standards participation. His current focus is on the interactions between electronic sound systems and architectural design as it relates to speech privacy and speech intelligibility in building spaces. Roy has been an elected Fellow of the Acoustical Society of America since 1999 and is a member of numerous professional associations, including ASTM International, ASHRAE, USGBC, the American National Standards Institute (ANSI) and the International Organization for Standardization (ISO).