



PBS Client Enrichment Series – Q & A



Topic: Workplace Design - Lighting and Acoustics

Presenter: Kevin Kelly

Dates of Presentation: December 9, 2021

Link to Client Enrichment Series Information: www.gsa.gov/ces

Additional Coworking Information

- *Lighting and Acoustics* - CES Session [YouTube Video](#)
- *Lighting and Acoustics* - CES Session [Slide Deck](#)
- GSA's [Sound Matters](#) publication
- [Total Workplace Scorecard](#)
- [Shape Your Workplace With Activity-Based Planning](#) CES Session
- Workplace SMEs - [National and Regional POCs](#)

- 1) **Question: Do you have recommendations on how senior leadership can be convinced of the importance of good/desirable/proper/adequate lighting when the dissatisfaction percentage is only 9%? Our leadership tends to focus on percentages when implementing something that will cost us money. I believe it is likely a higher percentage, but people tend to complain more readily regarding noise versus light.**

Answer: Noise is a priority. It can be virtually impossible to concentrate without an acceptable level of sound mitigation. As I pointed out in the presentation, this is more difficult after build-out. I might think about accessing some acoustics expertise to identify potential problems. One of the things that is constantly undervalued is well-tuned cover sound, and this is quite reasonably priced if done initially. People do not understand just how critical it is and often dismiss it as something that they can value engineer out- to their chagrin. Additional sound attenuation can be added at vertical surfaces, (20% of vertical surfaces at NRC 80 - not as high as the absorption recommended for ceiling) This is most effectively deployed at corners.) But professional acoustical advice is well worth the price if you have acoustic issues. .

Lighting is a bit easier after the fact to improve compared to acoustics, depending on how bad the current lighting is. The first thing is to make sure everyone has an adjustable light at their worksurface . If it is possible to add a biophilic color/ pattern or



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image that can be continuously lit from above on vertical enclosure walls. Vertical lighting on walls/columns would come next along with ensuring that the ambient lighting is right around 30 Footcandles. Assess how bad the glare may be from windows. This is a challenging one but there is a lot of research to document that good lighting makes for more productive, rested and alert employees. Ideally, I am advocating for lighting to be considered (which it almost never is now) at the beginning of any project. The 9% dissatisfaction rate is based upon what workers are reporting for themselves and my impression is that this is employees reporting whether the lighting is adequate for the vision to do their work. This is a function of not knowing what you don't know. Other lighting deficiencies may be much less to the forefront of their consciousness, but that doesn't mean that it isn't affecting them at a physical and psychological level

One strategy that we have used successfully is to do a pilot on a smaller portion of the office and to measure before and after satisfaction and performance. This could be a case where people don't know what they don't know: in other words, the worker may not be aware of how much better their work experience could be with better lighting.

2) Question: How for you accommodate someone who has a sensitivity to light?

*Answer: I am not quite sure what you're asking, for instance I know people with migraines can be particularly sensitive to light. These sensitivities almost always involve glare which is a function of contrast ratios being out of whack, in other words for something bright being next to something much darker. This is why contrast ratios are so important to the design guidance for the design.. When the tool I mentioned on the call comes out ("Light Matters" is projected for late spring 2022) there will be a section- a very important section on contrast mitigation, check out this link for a digestible discussion of office lighting:
<https://www.wework.com/ideas/workspace-solutions/flexible-products/best-office-lighting>*

3) Question: How do you feel about light sensors in the workplace to save energy, having to get up and move to reactivate the lights?

Answer: I know that they can be very annoying to some people, though not so much to me. Maybe I never sit still long enough! I think the task lighting that turns off after one leaves the desk, that was adopted after piloting by GSA's Proving Ground is a great plus for unobtrusive energy conservation.

4) Question: Is it best to have a window at your back?

Answer: It depends on which elevation the window is facing. If it is north, it tends to be



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less harsh and thus, casts fewer shadows. If it is south, there will be strong light throughout the day and if from the west and east, part of the day. . This could result in glare and shadows. I believe that the best placement for monitors is at 90 degrees to the window for the best all around lighting throughout the day. Definitely the worst location is in front of a non-north facing window which makes the eye tired trying to adjust between the bright outside and the monitor. A real headache recipe for most people!

- 5) *Is there a regional Subject Matter Expert that reviews drawings for lighting?*

Answer: There are reviewers of drawings, but the purpose of my work is to raise the visibility of this issue at the beginning of the project process, to make sure it is well covered in the scope. If it is not in the scope at the very beginning, reviewing it later on may require more cost than considering it and emphasizing that to the contractor/ designer.

- 6) **Question:** *I'm seeing more complaints re: temperature and odors (neighbor's food) in a work space with low partitions - any thoughts?*

Answer: Rather than low partitions being the problem, it sounds as though it is a mechanical problem with inadequate ventilation or filtration. If break areas were decent spaces that people want to use conveniently, eating at the desk might be less prevalent. If high partitions are used, I would recommend them to be glazed above 54" and placed 90 degrees to the window wall, so as not to impede the all important presence of light and view. By the way if you must use higher partitions, ensure that they are stackable which will give you flexibility to make some lower where appropriate and to respond to future need.

- 7) **Question:** *How can acoustics be resolved in historic assets with high plaster ceilings and hard flooring?*

Answer: Absolutely. See this short video I made about using absorptive materials in an historic structure. There are also a whole new crop of felt-like baffles that can be hung from ceilings that do not interrupt the sprinkler system that are great. Acoustic panels may be applied to plaster walls with very reversible, easy clips (see video). By the way, clickity-clack on flooring is annoying, but tends to be less disruptive to concentration compared to overhearing other people talking, especially if it is something not related to the group's work. Prioritize: ceilings, then walls, then floors.

- 8) **Question:** *Do you have any lighting resources for 24/7 operational centers that don't have windows?*

Answer: Yes! This is the kind of facility that really needs to have circadian-tuned



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lighting if at all possible to tune the light to both the time of day and the body clocks of the staff in the space so that they are adequately rested and alert. We also find that biophilic (natural) patterns and colors with images that relate to nature such as landscapes, trees, etc are very helpful in reducing stress in these conditions and reminding people that though they may be in a very unnatural environment they are still part of the natural world! Also, nearby there should be break areas out of the windowless space where plenty of sunlight is available. Two resources: GSA's Bryan Steverson in the Office of High Performance Buildings (bryan.steverson@gsa.gov) has done a lot of work on this low light issue. He can help with more info on this. Also, stay tuned for GSA Center for Workplace Strategy's upcoming talk by Nancy Clanton who is one of the nation's foremost lighting experts, She also has this kind of direct experience, I am pretty sure with DOD windowless facilities. This presentation is planned for March, 2022. Stay tuned!

9) Question: Where do we find the POC Workplace Executive's name for our servicing Region?

Answer: See this document for a map of our nationwide network of Workplace professionals who can assist you with lighting, acoustics, and other space design consultation.

10) Question: I am a project manager who writes SOWs that are design/build for small (under prospectus) projects. Can you please send me some language that I can include in my scopes that would ensure the design team addresses all of these Lighting/Acoustic issues?

Answer: I am working to get this information out in "Light Matters" which I expect will be out and of great benefit in the next few months. I use a reference to "[Sound Matters](#)" in scopes and say that the A/E must follow the mitigation recommended on Page 11 - or a substitute to be approved by the scope writer.

11) Question: How do we get the kind of technical guidance you need to implement these ideas?

Answer: I think that getting professional advice is well worth the price. For instance on design/build projects make sure that an acoustician's hours for advice is included, and likewise require that an A/E show proof of understanding or having experience with good lighting. Again, asking for what you need at the very beginning is crucial. I always attach "[Sound Matters](#)" to a scope and tell the A/E to reference it and comply with Page 11 as it relates to mitigation. I will do the same with "Light Matters" once it is finished. With the [GSA Workplace Scorecard](#). I like to specify what score is the minimum for a design/build to achieve based



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upon the market area. Not unlike LEED, this gives leeway to achieve a cost-effective but well performing facility.

12) Comment: *We learned the acoustics lesson the hard way. After a lengthy build-out to more open space and less personal offices, and noise transfer across the open spaces was horrendous...AND between offices. Walls were not acoustically insulated, and sound would transfer between offices above the ceiling through the air returns. Invested in some noise generators, and started the process of looking into acoustic panels, baffles, shrouds over the air returns, etc. Would have been so much simpler and cheaper to have this added in the planning phase...*

Response: *AMEN! I am doing this sort of work to avoid this kind of painful and expensive redo...and as you probably found out it ain't that easy to do afterwards, whereas it would have been so easy before!*

13) Question: *In your opinion, are you seeing a trend in the private sector towards these workplace lighting and acoustic solutions, or would you consider the Government to be leading the industry? I'm asking because it's important for our community to have an understanding of how/where our buildings rank relative to competitive properties in the market.*

Answer: *Definitely these are areas that the private sector is taking the lead on doing, not out of the goodness of their hearts, but because the most effective companies realize that environment matters to worker effectiveness. For instance, in any major city, if you walk down the street in a business area you will see that the better buildings use pendant direct/indirect lighting - you see from the street in the evening. Likewise, architectural and interior design publications are chuck full of acoustic material advertisements.*

14) Question: *Can an office be too quiet?*

Answer: *Absolutely. If you can hear a pin drop, you can hear EVERYTHING and EVERYONE. This is the reason why adding cover sound to an environment is absolutely critical for speech privacy. One of our problems is that modern mechanical equipment has become so quiet! Though it would come on and off, old, clunker mechanical equipment could sometimes offer a poor man's sound masking.. Not so much anymore!*

15) Question: *Will GSA reform its policies on light fixture distribution and construction cost allocation between tenant and lessor/owner?*



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***Answer:** I would certainly advocate that and there are many in the agency who would agree. We're working on it and I hope that with the new workplace environment and leasing climate, this can be worked out to the benefit of workers and the taxpayer. Stay tuned.*

16) Comment: *A line I came across a few years ago at LightFair. "We really have no idea of what produces good lighting . . . at the moment, it most frequently occurs at the conjunction of a talented architect and a creative lighting engineer, neither of whom is given to slavishly following numerical criteria." --Boyce, P. R. 'Lighting Quality: The unanswered questions', Proceedings of the First CIE Symposium on Lighting Quality.*

***Response:** Absolutely, there is an art to lighting that goes beyond engineering. But like the art of architecture itself, engineering -and shall we say artistic vision - support each other. There really are three main kinds of lighting: **Ambient** (so that you can see where you're going, **task** so you can see what your doing without glare or shadow interfering and finally, **focal** which is where the real art comes in in my opinion. It has to do with the selection of color/ texture/ image or object that the designer wants to emphasize in creating the desired mood with lighting that emphasizes. I would say (again) that this is where vertical illumination is essential and will make the space look much more natural and welcoming - a place where people actually want to be.*

17) Question: *I'm at the beginning of the construction phase. How can I get the sound masking input at this point? It's a little late to go to "all stop" to make changes to my SOW.*

***Answer:** The good news is that the sound masking is usually installed right above the ceiling tiles so it is a late stage addition anyway. Also, you may want to test it when it is unoccupied first. As I said in the presentation, the cost compared to the benefit is absurdly low - just be sure you're getting one that allows refined adjustment / tuning so that it is obvious and responds to different noise levels in the space. Likewise, sound absorption can be added to walls and suspended from ceilings. By far the most disruptive and expensive acoustic feature to add after the fact is the blocking between rooms, but the sound masking can help greatly with that also. Cambridge, Logison - there are several good sound masking firms that can help with this!*

In selling it, I would say that it wasn't included in the scope but we are becoming more aware of how important this is (use the money slide about sound masking in the presentation), Also say that the first sound masking systems were not nearly sophisticated enough, so people began dropping them. That situation has totally turned around and it would be too bad



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to leave it out now considering how inexpensive it is now, what the enormous life cycle benefit will be and how expensive and disruptive this can be after the fact...

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I would like to thank our consultants, Skylab Architects, Portland, OR, Arup, San Francisco, CA and AC/COM for their cooperation and the images gathered in preparation for "Light Matters." Additionally, the following credits on the slides in the presentation :

- Slide 5: Based upon Construction Industry Institute graphic*
- Slide 6: Center for the Built Environment: Top 3 workplace irritants*
- Slide 9: Arup illustrations from Light Matters*
- Slide 18: Upper right, Perkins and Will*
- Slide 27: Arup from Light Matters*
- Slide 28: Denver Art Museum, David Liebeskind
Lacton and Vallaton, Pritzker Prize winners*
- Slide 30: Middle RTKL, DC office
Brodie chair, Steelcase*
- Slide 31: Solatube*