



AN APPROACH TO HUMAN WELLNESS IN EDUCATION FROM THE FLOOR UP

Content from CEU presented by Mohawk Group

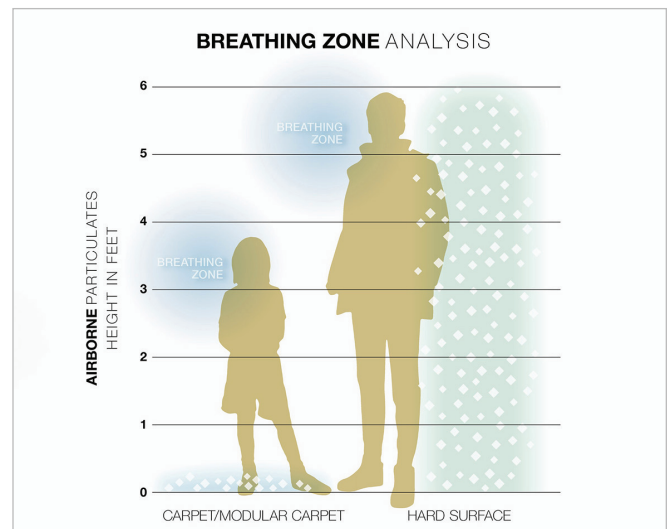
Flooring is the most pervasive surface in any building. It is virtually everywhere. So, it shouldn't be surprising to learn that flooring in schools has profound impact within the built environment that can affect human health and therefore, human performance for both students and teachers. This white paper is a summary of the presentation An Approach to Human Wellness in Education from the Floor Up. We believe that you will find it a useful reminder of the many characteristics of flooring that should be considered when specifying flooring for schools.

The Air We Breathe: Addressing Indoor Air Quality in Schools

Flooring influences indoor air quality in more ways than most people realize. Almost everything in a building inherently emits volatile organic chemicals (VOCs), including flooring. The US carpet industry, working with government and private agencies, pioneered VOC testing over twenty years ago. Today, Green Label Plus certification is recognized globally as the gold standard certifying low VOC emitting flooring, as is the FloorScore certification for resilient flooring, which is based on the same testing and performance standards.

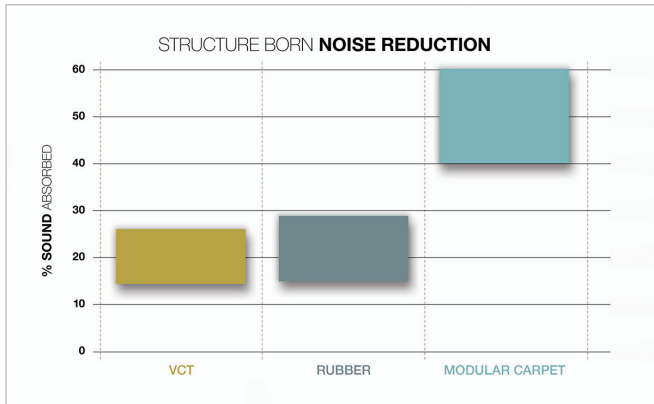
High moisture content in school subfloors is common, and undesirable. High relative humidity in subfloors can catalyze the hydrolytic breakdown of some chemicals used to manufacture flooring and installation adhesives. This can release VOCs into classroom air, which often have an objectionable smell and can also trigger symptoms of asthma and allergies. While flooring products resistant to hydrolytic degradation are available, some work better than others. Ultimately, the best solution is early identification and remediation of high moisture conditions. These high levels of moisture also create environments favorable to the growth of mold, mildew, and bacteria, some of which release mycotoxins, another airborne contaminant. Minimizing the levels of these contaminants again includes reducing moisture levels, and also requires effective sanitizing or disinfecting. And this applies to virtually all types of flooring. The effectiveness of anti-microbial additives in reducing infections is not well-established. Flooring can act as the first line of defense against high levels of dust and other breathable particles suspended

in indoor air, which are a leading cause of symptoms of asthma and allergies. Modular and broadloom carpet are particularly effective in preventing the airborne redistribution of respirable particles.



You Need to Hear This: Acoustics

Sound waves can be absorbed, reflected, transmitted or diffused when they strike a surface. Flooring which absorbs sound waves is proven to reduce both reflected and transmitted sounds in classrooms. Some flooring can absorb airborne sound waves originating in classrooms, thereby minimizing reverberations, and reducing echoes, promoting higher speech recognition and effective teaching and learning. Modular carpet and broadloom carpet are particularly effective in absorbing echo-producing sound waves, as proven by measuring the noise reduction coefficient (NRC). Flooring can also minimize distracting background noise that is transmitted through the floor/ceiling structures of the building in multi-story schools. Modular and broadloom carpet are particularly effective in reducing structure borne noise, and modular carpet has been shown to be more effective than most other types of flooring, as shown by measuring the sound transmission classification (STC), and does not usually require adding an additional layer of sound absorbing material to meet acoustic requirements.

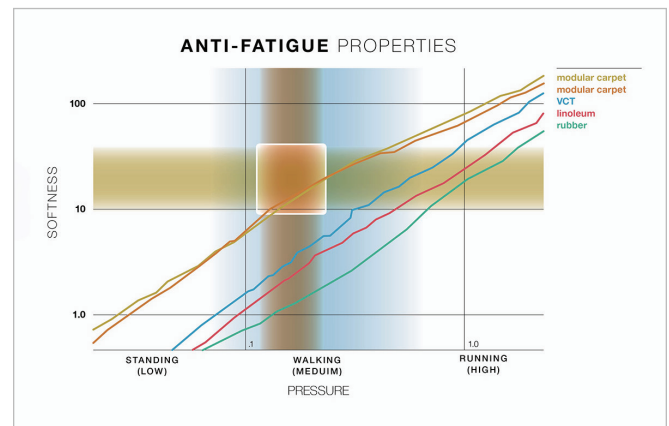


The Economics of Ergonomics and Safety

Plantar fasciitis and heel spurs are repetitive stress injuries to the foot that are common among teachers, contributing to significant discomfort and often leading to absences and even early retirement at a time when schools are struggling with hiring and retaining qualified teachers. There is no accepted standard for measuring the anti-fatigue properties of flooring. It is typically assumed that “softer is better.” But measuring the compressive modulus of materials, which is used as a tool to develop running shoes, is one way of comparing the energy absorbing characteristics of flooring. Modular carpet is the only surface tested to-date which has shown useful anti-fatigue properties. Underfoot comfort is very subjective. It is more a perception than a measurable property. What feels comfortable to one person may not be comfortable to another. A person’s age, weight, footwear and preexisting medical conditions are some of the variables which can influence individuals’ perception of comfort. Padding and cushioning underlays for commercial and institutional flooring are often installed to enhance the perception of underfoot comfort in classrooms. Underlays are also known to decrease structure borne noise and enhance thermal comfort. Underlays which are thinner and denser are more likely to prevent repetitive stress injuries from standing and walking than those which are thicker and lower density

Slip/fall injuries are a common accident in schools. While accurate data for the frequency and injury rates for slip/fall injuries in schools are not available, what data is available supports the assumption that it is a serious problem, affecting hundreds of thousands of faculties, staff and students and costing school systems millions of dollars annually. Slip/fall accidents are caused by a loss of traction. For decades, measuring the static coefficient of friction (SCOF) was

considered sufficient, despite criticism that the test method did not accurately simulate the biomechanics of a slip/fall event, and that SCOF tests often showed poor statistical reproducibility. And, the SCOF test method is typically used only to test new flooring material. Recently, the National Floor Safety Institute (NFSI) and other agencies developed methods for measuring the dynamic coefficient of friction (DCOF) which more accurately simulates the biomechanics of a slip/fall accident, and which has better statistical reproducibility. And the DCOF test method requires pre-certification testing of surface-contaminated flooring in the laboratory followed by in-field testing of flooring that has been installed for several months, to observe any changes in DCOF caused by wear and residues of cleaners and polishes. So, which test method is better? Although there is no clear consensus, it appears that the DCOF is gaining wider approval. The current OSHA guideline for the SCOF is 0.5 under dry conditions. The NFSI currently requires a DCOF of 0.6 under wet conditions to achieve its High Traction Certification. Most flooring is considered safe from slip/fall risks if it is not contaminated.



Designing for Student and Teacher Success

A recent article suggested six “design hacks” for classrooms: optimize for inclusion, promote interaction, decorate deliberately, set the tone with color, turn down the volume and tap the power of nature. Learning spaces should be flexible enough to support both individual and group work. Flooring patterns can provide visual cues for arranging seating so that students can make eye contact with one another and decenters the teacher as the sole focus of instruction.

Some researchers recommend increasing colorful visual stimulation when classrooms have a muted color palette on their walls. This could certainly be done by using stimulating



colors and patterns in the flooring. Others recommend employing “calming” elements if the color palette of the classroom is already bright and stimulating. This could be accomplished by thoughtful selection of muted flooring colors and patterns if classroom walls have a stimulating color palette. Remember that using flooring that absorbs sound waves creates quieter classrooms than flooring that reflects sound waves. And also remember that in multi-story schools, flooring that absorbs sound waves can prevent noise transmission through floors and ceilings.

Research shows the impacts of various classroom design strategies on learning outcomes and that “naturalness”- or the extent to which a classroom environment simulates the outdoor environment- had the single greatest impact on learning outcomes. For almost twenty years flooring manufacturers have offered literally thousands of combinations of colors and patterns which “bring the outside, in.” And there is more to come as flooring designers probe more deeply into understanding fractal designs, for example, and their powerful connection to human emotions.

Leveraging Government Funding for Healthier Space Enhancements

As a result of the Covid-19 pandemic, two federal programs were enacted which provide funding to upgrade elementary and secondary schools and institutions of higher learning. The Elementary and Secondary Schools Emergency Relief (ESSER) and Higher Education Emergency Relief Fund (HEERF) funds were made available for qualifying projects which create healthier school environments.

The deadline for submitting proposals for funding lapsed on 9/30/22. But funding is still available for approved projects which have not yet used their allotments. The deadline for spending approved funds is one year from the date of approval, and there are undoubtedly many projects which met the submission deadline and are awaiting approval. So conceivably there is still time to select safe and healthy flooring before spending deadlines expire. Depending on the approval date, this could possibly extend into 2024.