

A COLORFUL COMEBACK: BUILDING TEAMS GO BOLD WITH COLOR



PAUL RICHER, COURTESY MHTN ARCHITECTS

For Mount Jordan Middle School, in Sandy, Utah, vibrant colors create focus for entry areas and six learning communities.

The minimalists and severe modernists are losing out. Even as project teams create zen-perfect, serene environments in their buildings, they are applying more and more color these days. The effect is a more dynamic and diverse world of buildings, say experts, as well as positive effects on occupants and visitors.

“Research indicates that design and planning for appropriate use of color and light increases efficiency and provides for proper and safe communication between space users,” according to Reza Babakhani of Iran’s Islamic Azad University, writing in the *Journal of Architectural Engineering Technology* last summer. Babakhani studied six combinations of room colors and lighting types to determine emotional

effects on the occupants, with descriptors ranging from “cold-lifeless” to “warm-relaxed.”

“The colored glass and doors, as well as colorful carpets used significantly in the past, affected the residents’ spirits positively,” Babakhani wrote.

While Babakhani and others lament that the “long-term deep effects of color and light on the spirit of space users has been forgotten in recent years,” recent building projects suggest resurgent interest in using color and experimenting with its positive effects.

One high-profile building opened in 2015 at the Children’s Hospital of Philadelphia (CHOP) expansion campus. The 700,000-sf Buerger Center for Advanced Pediatric Care features a green roof and vibrant, curving bands of colorful coated metal façade panels and soffit that accent

LEARNING OBJECTIVES

After reading this article, you should be able to:

- + **DESCRIBE** the beneficial uses of color for healthcare facilities, with specific references to key areas of hospitals.
- + **EXPLAIN** how color use in schools can impact the performance of students.
- + **LIST** the factors linked to color and perception that can affect the safety and wellbeing of nursing home residents.
- + **DISCUSS** approaches to selecting colors for hospitality facilities based on their psychological effects.

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the dynamic 12-story and six-story forms. Built by Turner Construction and designed by Pelli Clarke Pelli Architects—in association with Ballinger and FKP Architects, on a master-planned site designed by Cooper Robertson—the vibrant building welcomes children and their families with exuberance and uplifting associations.

Continuing the exterior motifs, the interior spaces of the Buerger Center present colorful circulation areas with pods offering *positive distractions*, such as learning exhibits and interactive play zones where children can engage between appointments. Other healthy distractions include artwork, healing gardens, outdoor views, and natural light, according to Patricia Malick, CHID, EDAC, NCIDQ, Principal with Array Architects.

The colors and designed settings in the Buerger Center “reduce the stress typically associated with hospitals,” says the project team. One parent of an 11-year-old patient called the building “an architectural breakthrough and a blessing for any parent who has a child with complex medical needs.”

As reported in *Building Better Healthcare*, a recent study (tinyurl.com/ColorStudy18) by coatings maker Dulux demonstrates how certain hues can impact patient health and wellbeing. The findings include specific recommendations for healthcare facility zones, including:

Waiting rooms. Select colors that are uplifting and interesting, with accent hues to highlight different departments and to create modern and temporary environments.

Corridors and reception areas. Divide long corridors with strong accent colors to aid navigation and help identify hospital departments. Strong colors may also be helpful as a backdrop at reception areas.

Cafés and restaurants. Use warm hues to create an attractive and restful experience in public areas and foodservice zones.

Patient rooms. Lighter and softer palettes are recommended for inpatient rooms, with highlight hues at sinks, bathroom areas, and window areas. In pediatric wards, more visual interest and vibrant palettes help reduce anxiety and even add a sense of diversion.

ICUs. For intensive-care units, use soft neutral tones to impart a relaxing, calming sensibility. Nearby consultation areas can have warm neutral colors, as well.

At the Buerger Center, the color palette deftly creates a decidedly animated image upon approach. Inside, the same bright palette reinforces the wayfinding scheme from the garage to the corridors to the waiting areas and patient rooms. A single color scheme links the interiors and exteriors on each building level. The thematic colors invite families from elliptical glass elevator enclosures

to lively welcome centers on each clinical floor, while children are attracted to the “Wait, Play, Learn” displays in colorful pods.

The *colorway* or color family employed for the Buerger Center borrows from a collection introduced last year by Valspar, which the company explains has “taken today’s lifestyle trends and translated them into four color palettes that set the tone for tomorrow.” The four are called Future Lux (from rustic to satin to metals), Always On (inspired by the digital world’s vibrant colors), Hit Pause (healing colors and rich natural tones), and Life in Flex, which bridges work and play and animates the new Philadelphia hospital. The same palette also informs a number of workplace, retail, hospitality, university, and K-12 building projects, Valspar notes.

In a targeted contribution to K-12 schools, the coatings maker PPG helped revitalize classrooms at Funston Elementary School in Chicago as part of its Colorful Communities program, which brings volunteers and paint products into needy areas of the country. According to the project leaders, the school upgrade inspired the teams to choose colors for their vibrant impact, but also to help create a calming and mindful effect on students. The approach reflects best practices in school design today.

FOR SCHOOLS, MORE COLORS

A two-year study conducted by Canadian consultant Warren Hathaway considered the impact of an educational facility’s visual qualities on student performance and other measures such as absenteeism, overall student attitudes, and even dental health. The addition of ultraviolet lighting, for example, had a very positive effect on students, whereas high-pressure sodium vapor lamps, known for their poor color rendering index, or CRI, were correlated with the worst student performance indices in achievement and physiological development. Could the same clear differences in



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A colorful flooring motif offers learning tools for the STEAM-focused Mount Jordan Middle School, with patterns inspired by scientific diagrams of Cartesian grids, the solar system, and molecular structures (top). Its visually stimulating color palette energizes the campus and informs wayfinding, starting from colorful canopy entrances (above).

performance also be related to color alone?

A study by the Healthy Campus Initiative at the College of St. Scholastica, in Duluth, Minn., focused exclusively on how changing finish color in study classrooms could impact students. Reflecting recent findings in color effects on student performance, the team compared an all-white control classroom with a version with three walls painted beige (a hue known to diminish tension) and a front wall coated blue-gray (a color expected to reduce student eyestrain).

Comparing quiz scores over a semester, the test group was found to have better performance over the study period, according to the study's leaders, Heidi S. Johnson, MLIS, and Jennifer A. Maki, PhD, both Assistant Professors at St. Scholastica. "This simple change appeared to positively affect students' ability to stay on

task, perceptions of learning, and emotional wellbeing," according to the researchers. "Education institutions may want to consider adding color and making other small environmental changes for classrooms at all levels."

Many schools are adding more dynamic color schemes to not only improve student prospects, but also to enliven campus areas or create vibrant, memorable school zones. The recently completed Mount Jordan Middle School in Sandy, Utah, designed by MHTN Architects and built by

Hogan and Associates Construction for their client Canyons School District and 320 students, has garnered international acclaim for its daring use of color throughout the 206,670-sf, \$38 million facility.

From its bold red canopy at the main entrance to its primary corridor with yellow-striped portal entries and swirling geometric graphic patterns meant to highlight the proportions of the earth's core, the middle school brings a unique and creative approach to reinforcing wayfinding and enhancing the curriculum. An expert in applied color psychology, Karen Haller, speaking as part of a WAN Awards jury, added that Mount Jordan's use of color "can support the wellbeing and learning for the students in an engaging, inspiring, and positive way."

The facility replaced a 1950s-era middle school at the same site. The new school has been called "a showcase learning facility built for the community" that "looks equal parts tech office and middle school." But is the effort and expenditure worth it? A number of recent studies looking to clearly link school building design with educational outcomes have determined that test

scores tend to be higher in schools with certain characteristics—traits that may influence testing by as much as 15%. Notable studies reported by the Council of Educational Facility Planners International (CEFPI) have revealed that factors such as student background and behavior were shown to have less impact on academic success than the condition of their school buildings and classrooms. Studies of K-12 districts in Pennsylvania (tinyurl.com/y8e9zaln) and Wisconsin (tinyurl.com/y8v3ckm7) have confirmed this finding, and a national survey (tinyurl.com/y85bmd93) of school principals completed in 2010 reinforced the conclusion.

The principal interviews "supported the notion that educational facilities do matter and they affect the delivery of instruction," according to the national study's author, Ibrahim Duyar, in the Department of Educational Leadership at the University of Arkansas at Little Rock. "Facility conditions accounted for 43% of the explained variation on the delivery of instruction with a medium-sized effect," said Duyar.

So how does color fit into this equation? Brain research has demonstrated how color and lighting influence learning, with "warm colors and brilliant lighting increasing muscular tension, respiration rate, pulse, blood pressure, and brain activity," while "distracting color combinations can lead to task confusion and slow reaction," according to the educator group ASCD, Alexandria, Va.

As found more than 50 years ago by American color theorist Faber Birren, appropriate use of colors—as well as lighting—are tools for improving visual processing and reducing stress. That's one reason that more senior-living facility operators, workplace consultants, and employers have pushed to include more colorful façades and interiors in newly constructed environments.

COLORS FOR AGING EYES

In response, several manufacturers of coatings and paints offer specific palettes intended for use in retirement settings and assisted-living facilities. Sherwin-Williams, for example, has introduced Senior Living Color coordinating palettes targeting specific situations or building needs. One of those, called Memory, offers a "lively, rousing palette" in consideration of potential benefits for memory care facilities, where the goal is to help aging eyes "see" better. "With both warm and cool tones, these saturated colors can highlight the location of certain rooms or lead people along a 'wander path,'" according to Sherwin-Williams. The technique, also promoted by clinicians and operators of senior centers, incorporates more variety of hues and brighter colors that help residents with wayfinding and distinguishing between similar spaces.

COLOR IS WHAT WE SEE FIRST. WE RECOGNIZE COLOR BEFORE SHAPE, AND COLOR GIVES THE BIGGEST IMPRESSION!

— PER NIMER, COLOR EXPERT



MARK BALLOGG (LEFT), JEFF GOLDBERG / ESTO (RIGHT)

Similar ideas helped guide the design of the Klein Center, a 127,000-sf long-term care facility in West Burlington, Iowa, designed by Minneapolis AE firm Horty Elving for the operator Great River Health Systems.

“Green is a calming color and gives a sense of life and new beginnings. Brown is grounding. And blues soothe and instill confidence,” says interior designer Jennifer Paist, CID, Project Manager with Sperides Reiners Architects, who worked on the Klein Center project.

With these effects in mind, Horty Elving used greens and blues in bedrooms to make them more tranquil and comforting. A “judicious use of red and yellow” in the memory care facility’s dining room is intended to help stimulate appetites. Elsewhere, the design team used colors of the southeast Iowa landscape and the Mississippi River valley to create a sense of connection, familiarity, and safety, which is ideal for long-term care facilities and especially occupants with dementia, according to Paist. The exterior’s stone base, gabled roofs, and color palette reinforce this outdoors, including in its shared courtyard. Inside, Great River Health Systems organized the community in 10 residential groupings around a “town center” near the primary entry zone, with a chapel, salon, coffee shop, library, and town hall.

The value of color in supporting these kinds of schemes is clear, even as aging seniors experience a degradation of their ability to see color. According to the American Optometric Association, both advancing age and many common medications, such as for heart disease and high blood pressure, can affect color vision. In addition, numerous medical conditions can cause color deficits, such as diabetes, glaucoma, and both Alzheimer’s and Parkinson’s diseases. These all can impact light-sensitive pigments found in photoreceptor cones in the retina, which are sensitive to red, green, and blue

light; if a pigment is missing, color vision is limited.

While these facts of aging may suggest more use of bright colors and sharper contrasts, experienced project teams avoid sharp changes in light levels, as aging eyes are less adept at adjusting from light and dark illumination levels. These sudden changes are especially disconcerting and possibly unsafe for residents with Alzheimer’s disease, according to Rosemary Bakker, MS, an interior designer and dementia specialist at Weill Cornell Medical College. Bakker offers a few guidelines for designing dementia facilities:

Circulation aids. Consider using wood species or paints of different colors for stair treads and risers. A bright-color tape or paint applied to stair noses or carpeted circulation areas can also improve functionality for seniors, including those with Alzheimer’s.

Flooring materials and details. Glare and perceptual issues can be disorienting and dangerous, says Bakker, so project teams should avoid shiny resilient flooring or any surfaces with polished finishes, which also helps eliminate slip-and-fall incidents. Eliminating doorsills for zero-height thresholds and using specially designed transitions between resilient-to-carpeted areas are also typical details.

Lighting specifications. Facilities should minimize glare from lighting fixtures on nearby surfaces such as floors, tables, and walls to reduce distortion of visual perception. In addition, senior facilities tend to have a high number of electrical fixtures and outlets so that lighting levels can be fine-tuned as daylight changes.

According to Veronica Connallon Arcaroli, Director of the Architect and Designer Segment with Benjamin Moore, “Not only are we living longer, but senior citizens are the fastest growing segment of the world’s population.” For that reason, issues related to the aging

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Left: Metal cladding panels in five custom grey shades of protective PVDF coating present a modern look in a classic color palette for a Hilton Garden Inn in downtown Chicago.
Right: A single set of thematic colors assists wayfinding by matching outdoors, indoors, and the garage of the Children’s Hospital of Philadelphia’s Buerger Center, designed by Pelli Clarke Pelli Architects.

BRAIN RESEARCH HAS DEMONSTRATED HOW COLOR AND LIGHTING INFLUENCE LEARNING, WITH WARM COLORS AND BRILLIANT LIGHTING INCREASING MUSCULAR TENSION, RESPIRATION RATE, PULSE, BLOOD PRESSURE, AND BRAIN ACTIVITY.

population, such as declining vision, affect more than just project teams involved in senior facility design. Whether in environments for the aging, workspaces, public spaces, or healthcare facilities, AEC teams increasingly consider color perception and how appropriate color use and application of low- or no-VOC, high-quality paint facilitates quality of life in all environments, says Arcaroli.

COLOR IN HOSPITALITY VENUES

In hospitality environments this also holds true, as two recent hotel projects show. One of the case studies reflects the popularity of very neutral colors, such as greys and beiges, which PPG reported as among the “most sold paint colors in 2017.” PPG adds that such consumer-preferred tones as Whiskers, Swirling Smoke, Dover Gray, Delicate White, Flagstone, and Toasted Almond were among their high-selling proprietary colors last year. The hues were often used with contrasting with trim, ceilings, or other highlights in warm or cool undertones.

With an engaging façade in five complementary shades of grey, the 26-story Hilton Garden Inn in Chicago’s North Loop creates a large-scale mosaic pattern with custom metal panels over its 10,000-sf exterior. Facing the Chicago River, the design by GREC Architects was conceived as an abstract representation of sunlight reflecting on a surface of water. It was developed by pixelating and translating imagery into colored tiles. According to Valspar, which supplied the metal panel coatings for the general contractor Walsh Construction, the owners of the Hilton Garden Inn and their development manager GDS Companies were looking for architectural differentiation in a city packed with many desirable hotels in the riverfront area, while also achieving a suitable aesthetic response for the downtown context.

Due to its very compact site between two landmark structures—the Chicago Motor Club and the Seventeenth Church of Christ Scientist—the hotel was designed with a primary façade that complements that of the Motor Club in contemporary language and materials. The riverside façade’s abstract mosaic contrasts with the primary elevation, creating a memorable contrast for the 96,000-sf, 191-room hotel.

In a very different approach, a new complex for Aria Resort & Casino in the Las Vegas CityCenter shows how “digitally inspired color” can create contrast and a center of attention in a city known for pure spectacle. According to Valspar, “While much of the space is made up of blues, greys, and silvers that add dynamism and reflection found within technology, expressive pops of color like Tart Orange help enhance the strength of the entire project and give it balance.”

Totaling four million sf and towering to 61 stories in height, Aria comprises two broad, curved high-rises of steel and glass with a joining base that extends to the other CityCenter developments. Owners MGM Resorts and Infinity World Development engaged Pelli Clark Pelli to design the facilities to also accommodate nongaming hotels, residential buildings, and retail spaces. Among the project’s most notable features is a unitized glass curtain wall with shimmering aluminum frames and no corner mullions. With an integrated sunshade system that includes projecting fins that range from eight inches to 24 inches in depth, the curtain wall coated in light and grey finishes contrasts with the orange and red hues and solid-white and greyish metal expanses nearby. Most important, the curtain wall brings carefully filtered light into many of the Aria interior spaces, enlivening the interior colors and energizing the casino resort experience.

How do hospitality design experts select color schemes for their client’s spaces? “One of the main factors in deciding on where to go for a meal, a drink, or somewhere to stay will be on how we want to feel—for example, uplifted, relaxing, peace and quiet, or playful,” according to the color expert Haller, in a recent interview with the ESI Interior Design blog. “Color triggers emotional responses.”

Haller adds that the successful hospitality companies maintain a “clearly defined brand personality” that includes tones of colors as well as a design style that together project the hotel’s special character and thereby attract a specific segment of the market. Haller says that those color tones put the consumer in a mindset of receiving a specific level of service as much as a specific feeling while being at the locations.



COURTESY EMC LTD.



For Maria Holder Nursery School in a residential area of Barbados, the design by Architects Cubed is a contemporary interpretation of the island's colorful chattel houses.

While every hospitality venue has its own personality and suitable colors, color experts like Haller note that blue tones are the least likely hues to be found in food-service establishments. While blue may be the most popular color and associates with oceans and cloudless skies, it's also the least common in restaurants. Reds and oranges are the colors of energy and tend to stimulate the appetite, while blues tend to have the opposite effect. Other color consultants point out that blue isn't found in many foods, and that bright blue surfaces or blue glass can change the light so that food actually appears less appetizing. Red, on the other hand, brings with it the symbolism of good fortune in Chinese cultures, making it culturally resonant in a Cantonese restaurant, for example.

According to color and *feng shui* expert Gina Mims, project teams should first apply color theory to ensure their selected palettes relate to a project's design concept. Brighter colors, for example, help reinforce a hospitality brand about vitality, energy, and the outdoors. Casual and intimate venues should use more relaxed, warmer hues to support the calm moods and feelings of closeness they seek to project. "It's all about the guests' feelings, not the owner's favorite color," Mims explains.

LASTING IMPACT OF COLOR

As stated by the psychologist Birren, the first color consultant and creator of applied color psychology, "The study of color is essentially a mental and psychological science, for the term color itself refers to sensation."

Clearly, restaurant and hospitality projects must draw in their customers with a variety of tools, including a highly considered use of color. Similarly, as seen in healthcare and educational environments, color can be an evidence-based ally in creating better outcomes for

students and patients. In other building projects seeking to project a strong artistic vision, however, color may be used in unexpected and unlikely ways. Often, these color choices are meant to build intrigue, contrast, or even a cognitive dissonance that leaves a lasting impression on the visitor.

Just ask the Brooklyn-based artist Mark Reigelman, who donned the hat of architect for a commission last year called *The Meeting House*, set in a park in downtown Boston. Calling attention to "the precarious and daunting state of American culture," while at the same time hoping to bring optimism into the community, Reigelman fabricated a New England Quaker-style structure of Eastern white cedar and birch plywood and positioned it tilted dramatically on a platform excavated into the Rose Kennedy Greenway. Already enough to set the viewer off balance, Reigelman also coated the entire 14-foot structure in a single hue—an unlikely bright yellow that the Quakers would have shunned—making the traditional woodworking of the meeting house glow with power and meaning.

Explaining the artistic choices and monochrome palette of his civic installation, Reigelman said, "In a contemporary society that threatens equality, challenges diversity, and contests progressive ideals, it is more important than ever for public art to become a beacon of optimism and inquiry within the urban landscape."

To work the mind, whether to create feelings or opportunity or civic awareness, the place to start is with color, says Per Nimer, a color expert with AkzoNobel.

"Color is what we see first," says Nimer. "We recognize color before shape, and color gives the biggest impression. If you want a space to feel warm, cool, intense, spacious, or any other feeling, you can almost always achieve this with color."+

+EDITOR'S NOTE

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