

Considerations of Color in Laboratory Design

Overview

Researchers spend significant portions of their time working in the laboratory environment and quite frequently can be found working long hours; it is in the best interest of both the researcher and institution that their time is spent productively and the researcher stays alert, precise, and healthy. In this aspect designers can assist by providing labs which are not only functional but also aesthetically pleasing. Traditionally labs have been aesthetically bland, sterile, and neutral colored. Designers often focus their energies towards lab function rather than creating a comfortable, pleasing environment. Research has shown that the built environment can have significant impact on the building occupants psychologically, physically, and emotionally. Introducing color into a laboratory through a variety of simple, low-cost means can improve the aesthetics of a space and may pay dividends in helping morale, productivity, and has even been shown to help reduce errors while working.

Research

Studies into the effects of color on human perception, emotion, and performance have been conducted for over a century. While there are many limiting factors in a subject as nebulous as the perception of color, research has become more sophisticated and great strides have been made through techniques such as galvanic skin responses, neuroimaging, and near-infrared spectroscopy.

It is believed that the prefrontal cortex of the brain is tied to mood-cognition, behavioral and emotional functioning.¹ It has been shown that this region of the brain is more active when exposed to environmental stimuli within the built-environment, including color. Further, research has shown that the built-environment can even alter ones' pulse rate and diastolic blood pressure.² Given these dramatic effects on building occupants' mind and body, it is critical that designers consider spaces aesthetically as well as functionally.

Artists have long believed that colors can impact a person's psyche and have distinguished "warm" colors as more active and "cool" colors as passive. Research appears to corroborate this intuition and long wavelength colors (e.g. red and yellow) appear have a stimulating effect and short wavelength colors (e.g. blue and green) have a calming effect.³

In one study conducted by The University of Texas, Austin, participants were subjected to a series of clerical tests within three identical offices, the only variable being the wall color; red, white, and green respectively. The study found that though participants found working in a white office as "most appropriate", significantly more mistakes were made in the white office than the more stimulating, red office. The researchers concluded that working in a sterile, white environment may not be as conducive to work as previously assumed.⁴ Unfortunately making practical use of this conclusion may prove to be difficult as subjects in the same study found that working in the red office environment to be more distracting. Additionally, though short wavelength colors appear to reduce stress and be more pleasing in a

working environment; they can also produce a drowsy, sleepy effect. Lastly a given persons' psychophysical response to color is influenced by learned associations and past culturally based experiences. As noted in a 1994 study by the UCLA Department of Psychology, context in which color is used has an important impact on a persons' reaction. Though blue is generally found to be pleasant, blue food will not likely elicit a pleasant reaction.³

Conclusion

The research into the psychological, physical, and emotional responses to color will be a subject of continued study, and the science of color and performance will continue to evolve. The potential benefits to occupants have been established however, and a designer should use color judiciously. For example, an entirely red work space will likely be too distracting and over-stimulating; while an all-white or neutral work space may appear too sterile and under-stimulating. Introducing color selectively within the lab and surrounding work areas is an opportunity to provide an environment which promotes a positive physiological and psychological response. Limited use of stimulating long wavelength colors, such as red, orange, or yellow, may be appropriate in lab / bench areas where attentiveness is critical to the research and safety; while shorter wavelength colors such as green, blue, or violet, may be more appropriate in investigator offices and break areas where safety is not as critical and provide a respite from the lab environment.

There are numerous opportunities in finish and material products to introduce color into the laboratory environment and each day more products become available. Bench tops can now be found in a large variety of colors and patterns. Flooring, such as Vinyl Composition Tile (VCT), can be used to provide splashes of color in an otherwise bland field and likely the simplest and cheapest means to introduce color in the lab is through the painting of wall surfaces. Designers who pay attention to providing comfortable, colorful and pleasing labs do a service to both the researchers within the lab as well as the research institution itself.

Reference:

- (1) N. Jalil, R. Yunus & N. Said "Environmental Colour Impact upon Human Behaviour: A Review" {paper presented at Asia Pacific International Conference on Environment-Behaviour Studies, Famagusta, North Cyprus, December 7-9, 2011}.
- (2) Y. Tsunetsugu, Y. Miyazaki & H. Sato, "Visual effects of interior design in actual-size living rooms on physiological responses," *Building and Environment* 40 {2005}:1341-1346.
- (3) P. Valdez & A. Mehrabian, "Effects of Color on Emotions," *Journal of Experimental Psychology: General* 123 No. 4 {1994}: 394-409.
- (4) N. Kwallek & C.M. Lewis, "Effects of environmental colour on males and females: A red or white or green office," *Applied Ergonomics* 21 No. 4 {1990}: 275 - 278.

