SECTION 4 - Design to Maximize Student Performance

THE COLOR OF LEARNING

Look around your office for a moment. Do you see only rows of solid walls of off-white gyp-board, pictureless, bland and lacking in purpose? What colors do you see? How do those colors make you feel? Warm, cold, frightened, safe?

Considering all of the elements that define interior design, the most prevalent and conscience-altering element is color.

Of all the forms of non-verbal communication, color is the most instantaneous method of conveying messages and meanings. Before humans learned to appreciate the aesthetics of color, there were the far more practical aspects of communicating with color. Our very survival depends on the ability to identify necessary objects and/or warning signals and color is an integral part of that identification process. Among other uses, color stimulates and works synergistically with all of the senses, symbolizes abstract concepts and thoughts, expresses fantasy or wish fulfillment, recalls another time or place and produces an aesthetic or emotional response.

There is no better proof of the effectiveness of color than the marketplace, where it is a vital key in communicating a positive, enticing and irresistible image for a product. Often called the "silent salesperson," color must immediately attract the consumer's eye.

Much of the human reaction to color is subliminal and a person is generally unaware of the pervasive and persuasive effects of color. The psychological effect is instantaneous.

Color adds tremendous meaning to communication as it vitalizes the visual message, delivering an instant impression that is, most often, universally understood. This is especially important in conveying a mood or idea where verbiage is not used or understood. Color is a universal language that crosses cultural boundaries.

ORIGINS, PHYSIOLOGICAL & PSYCHOLOGICAL IMPACTS OF COLOR

You are born with an attraction for particular colors. What you feel about them will probably last throughout your lifetime. Like you, your color choice is the result of your genes, early childhood memories, education, parent's beliefs, cultural training, political leanings, and other aspects of living.

Little children who cannot yet speak whole sentences will often express themselves eloquently with a set of crayons. Children usually love bright colors.

And so it is with adults. Preferences for one color over another reveals your true personality; the

characteristics of your "self" and of the eye with which you see from within.

Marketing psychologists advise that a lasting color impression is made within ninety seconds and accounts for 60 percent of the acceptance or rejection of an object, place, individual, or circumstance. Because color impressions are both quickly made and long-held, decisions regarding color can be highly important to success.

About 80% of the information which we assimilate through the senses is visual. However, color does more than just give us objective information about our world. It affects how we feel. The presence of color becomes more important in the interior environment, since most people spend more time inside than outside.

As an educator and an educational facilities planner, it's important to know how color influences learning and what colors are best for specific age levels and environments.

Color affects the totality of our being, the whole quality of our life each day. Colors can bring on illness or promote wellness; they can cause us to experience an uplift of spirit, a conditioned response to familiar surroundings, a slow boost into psychological well being and various other reactions based on the following eight significant factors.

The director of Wagner Institute for Color Research in Santa Barbara, California, Carlton Wagner, says that the response to color is:

1. **Inherited.** Your endocrine system reacts a certain way to a color because of the neurotransmitters you inherited from your parents. Here is how color plays a role in your hormonal secretions: You see a color, it registers in your brain and your brain sends out a chemical messenger (a neurotransmitter) for a certain hormonal response from the appropriate endocrine gland. An endocrine gland (a ductless gland) manufactures one or more hormones and secretes them directly into the blood stream. The endocrine glands include the pituitary, thyroid, parathyroid, and adrenal glands; the ovaries and testis; the placenta; and part of the pancreas.

   Endocrine glands react to colors as acknowledged by your brain. For instance, red is exciting to the human brain; therefore, neurotransmitters stimulate the adrenal glands to pump adrenaline into the body.

2. **Learned.** People and events from your past can cause you to like and dislike certain colors in the present. For example, a favorite grade school teacher's blue dress can stimulate an appreciation for blue in your adulthood. Yet, an intense dislike for that teacher might cause you to "turn off" to blue. In adulthood, you tend to respond to stimuli the way you were conditioned in childhood.

3. **Geographic.** The native colors of a geographic area you like can become your preferred colors. For

instance, green could be your favorite color if a rainforest with its lush foliage is a place that helps you feel at ease mentally, spiritually and physically.

4. **Regional.** Cultural attitudes towards specific colors can vary in different regions.

5. **Light.** The quality and properties of light can cause you to experience the same color differently when the light source changes. Stand at the rim of the Grand Canyon at five o'clock on a summer morning and compare the play of light at that time with the light fourteen hours later when the shadows have grown long and the sunlight has weakened. The color sensations will be different for you.

6. **Climate.** Each season of the year has its own characteristic temperature range and ratio of daylight to darkness. Any Alaskan can tell you about the seasonal depression that tends to come with winter and its daily shortness of light and color.

7. **Income.** All economic groups use status indicators, and color seems to be one of the most important. How you combine colors subtly reflects the class of people you associate with.

8. **Sophistication.** As you grow from your life's experiences, you tend to choose new color preferences.

Color has energy that impacts you psychologically and in turn physiologically. Variations in the number of impacts upon your eyes affect the muscular, mental and nervous activity of your body. For example, tests by engineers at the Pittsburgh Plate Glass Company, as described in the company's booklet Color Dynamics for the Home, indicate that if you are subjected to a certain color for even as little as five minutes, your mental and muscular activity will change according to your physiological response to that color. In other words, your physiological response to a color can affect you physically.

Engineers paint bridges blue when they stretch high over water or chasms to restrain potential suicides from jumping. Blue has a sedating effect. Moreover, when architects changed schoolroom walls from orange and white to blue, students' blood pressure dropped and their behavior and learning comprehension soared.

Since the beginning of time, colors have been symbols of abstract ideas.

However, the abstract ideas associates with any specific color are not universal in significance. The meaning of a color varies according to a person's race, creed, nationality and even physical, mental and cultural climate. For example, white in the West is a symbol of innocence or purity. In the Far East, white is symbolic of sadness and mourning, exactly as its opposite-black-is in the West.

PSYCHOSOCIAL EFFECTS OF COLOR

A great deal of research has been done on the psychosocial effects of color in humans. Swiss and German researchers, Luscher, Ostwald, Pfister, Rorschach and Vollmer, conducted detailed studies of the relationships between color and human response. In addition, Rose H. Alschuler and La Berta Weiss Hattwick compiled what is still considered the most important text on the color reactions of children: Painting and Personality (1947).

Does a child's choice of crayon color send an implicit message about his or her character? Can a simple color test reveal information about intelligence or personality? Many of the experts mentioned above spent their careers pursuing those questions. For the layman, they left a legacy of information and ideas that might make our work as educators more interesting and influential.

Consider the research that is emerging in the field of color therapy, the use of specific colors to alter moods, attitudes and behavior.

Findings regarding color and color therapy:

Here are a few results of studies on color and human response. They may help you in designing schools, classrooms and instructional areas.

- Color coding: using a repetition of colors may enhance memory in nursing home residents.
- Color may be used to give "cues" to the brain, about where to find information or an object in the classroom.
- The deliberate use of color in publications or text can enhance the readability of the narrative. This is especially helpful in breaking text into smaller, more manageable pieces.
- Color overlay: 80% of dyslexic children had increased reading comprehension when a blue or gray overlay was placed on the page.
- Shades of blue can actually slow down one's heart rate; hence "cardiac blue" is often used in hospitals.
- Shades of red can actually increase one's heart rate, and too much red can be downright distracting.
- The use of black and white as a color scheme may lower IQ or make children more "dull".
- The careful use of bold colors such as red or orange may increase IQ by as much as 12 points.
- In general, cool hues such as blue, are relaxing. Blue windows and walls were often used to help soothe mental patients who are delirious.
- Green is often associated with fertility, including "fertile thinking," as in creativity.
- Children start out liking yellow as infants but seem to grow less and less fond of it as they mature.
- The international "ranking of color preference" is blue, red, green, violet, orange, yellow.
- Though the international color ranking holds true (almost) across cultures, a few ethnic groups placed red or orange closer to the front, probably in response to ancient customs or practices involving color.
- Color and light have medical, therapeutic implications, hence the use of phototherapy units of blue lights to treat newborns with jaundice, or the use of white light to treat patients with depression

because of "winter blues".

- According to Alschuler and Hattwick, "Small children have a natural preference for 'luminous' colors such as red, orange, yellow and pink."
- Brown, black and gray are seldom chosen by children, except to outline. Excessive use of these colors has become an indicator of fear or defiance in their emotional lives.
- Bold colors, such as orange, red and shades of lemony yellow demand attention.
- Research shows that an occasional bold stroke of red or orange attracts the learner's attention to details.
- Both red and orange are useful for alerting children to specific points of knowledge or new concepts.
- Colors help children to express themselves.

THE POWER OF COLOR IN LEARNING ENVIRONMENTS

As infants, we are drawn to or repulsed by certain colors. We learn to communicate through color before our language skills are developed. In fact, color connects both the right and left hemispheres of the brain allowing both gestalt and analytic learners to interact and master specific tasks. There is a great deal of research that has captured how we interact with color, its impact on our decision making process and color's importance on our existence. There are even websites dedicated to art, the interior decorating industry, and cultural issues with chat rooms dedicated to discussing "mood" colors. The one questions most often asked and the least answered is, "What is the color of learning?" Is there such a thing as a "learning color?"

Color, more than any of the other senses, draws on both symbolic and cognitive powers to affect learning. Writing in a provocative piece entitled "Hue and Eye," art historian, Louisa Buck probes the intimate relationship between the artist's signature color (such as Van Gogh's yellow) and his or her message and meaning. For Van Gogh, yellow became an obsession, and he often wrote about seeking the "high yellow note," a quest to paint life in scenes of both health and disease. For Van Gogh, and for the youngsters in your classroom, color conveys more than just "color."

Color is everywhere, and imagining life without color is difficult and depressing. Color is part of our vision, our language, our art and our folklore. It is part of what we learn and how we learn it. Yet, as teachers, we know pitifully little about the use of color. Should we know more? Yes.

One might expect artists and poets to concern themselves with color, but what about teachers, administrator and facilities planners? We have even more evidence to suggest an investigation of the use of color in all learning environments, especially when young, impressionable children are involved. There's an important reason why.

The collective research over the past decade suggests that children today are developing awesome capabilities in their right cerebral hemispheres "at the expense" of the left-hemisphere skills. Apparently,

children have been immersed in visual imagery, such as television and video and are therefore quite adept at using the neural systems that carry this kind of information. On the other hand, they have become weak in skills that demand left-hemisphere strengths, such as the ability to "translate a narrative from a book in to a visual image in the mind." The home environment has changed substantially. Video (right brain) is king, while books and stories (left brain language) have been neglected. The result, for classroom teachers, may be children who have difficulty in taking the time or harnessing the skills involved in many language-heavy, left-brain draining activities. We seize the power of the visual and need to use color to stimulate learning. By using color carefully, we may be able to use visual imagery to coax more left-brain language activity. Admittedly, it is an inexact science; more of an art, but definitely worth a try!

For starters, try to use color to create a learning environment that is both aesthetically pleasing and useful for achieving the kinds of teaching and learning that you would want as well as the educators, administration and last, but not least, the students themselves.

Floor Coverings

Neutral or pale tones are best, with the exception of bold or printed rugs or tile in the art area. Be careful about boldly colored rugs in the reading circle. They may look cute but could be less effective than a shade of green or blue, which might encourage the children to sit quietly and read or listen to the story.

Bulletin Boards

There is a great deal of information available to educators and resource specialist that can aid in creating fun and invigorating boards. The trick is to be mindful of the "clutter" bulletin boards can create. This clutter or over-stimulation of information can actually detract from the learning process. Bulletin boards should enhance the environment and add color for the "season" or surroundings where learning takes place. Be careful to match the use of the bulletin board with corresponding background and accent colors.

Furniture

Chairs, cushions and seating in the reading area should be in fabrics that use color for reflection or relaxation: peach, rose, aqua blue, light brown, not neon or bold colors.

Walls

Warm, restful colors, in pale tones are best: light green, aqua, peach, cream. Avoid stark white. Avoid bold or dark colors.

Stationery

Send notes to parents about student progress or behavior (friendly rose or peach).
Send reminders (orange or yellow).
Send requests for donations or assistance in the classroom (friendly green or blue).

Conclusion

In summary: Addressing color in the context of learning goes beyond the simple question of "what colors

help kids learn?" Identifying learning environments as complete and integrated spaces and places that stretch beyond four walls is key to understanding how, when and why to use color to connect learning. Understanding the variety of learning environments is another key. Can a classroom and a conference be considered equal learning environments or do we treat each of these spaces as different learning spaces? These types of questions can spur debates among educators, facility planners, and designers that aid in reaching the end goal of maximum student performance.

But always remember that the power of color is undisputed.

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