Color, Texture & The Space In-Between:
An Architectural Intervention of Stained Glass

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Color, Texture & The Space In-Between: An Architectural Intervention

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Abstract

This thesis studies the use of stained glass as a building material and how it can enhance the visual presence of light, materiality and space in a building interior.

Lighting, color, and texture were integral paths of study which culminated in a stained glass installation at the concrete Cube at the Research + Design Facility in Blacksburg, Virginia.

The resulting space becomes a room that reveals a dimension of architectural space not rarely studied or thought about when designing, revealing the way light continually shapes and defines a space throughout the seasons and time of day. The goal of the installation is to highlight ordinary conditions of light and space in a new light through color intervention of the interior.
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Preface

“Color! What a deep and mysterious language, the language of dreams.”

- Paul Gauguin
Acknowledgments

I would like to thank:

My family- for their support and guidance throughout the years.

My friends (Greg, Mike, Mandy, & Steffany)- for their help and insight throughout the installation.

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Patrick Doan- for helping me through the technical aspects of this project.

I extend my deepest and utmost gratitude to all who have helped to get me to this point in my architectural career.
The Stained Glass Installation

The culmination of this thesis resulted in a stained glass installation that enhanced spacial qualities of the interior space of the Cube at the Research + Design Facility. After installing the stained glass panels, the space inside was recorded to document the ways color and texture influenced the resulting space.

In different weather conditions, the reflections change within the space. Under partly cloudy skies, the room has diffused light coming from the ceiling and the south wall. In rainy conditions, the floor becomes reflective and views from the ceiling can be seen.

The following pictures provide vignettes of the different reflections that can be seen throughout the day in different conditions and on the various building textures.

As a result from the design, building materials are transformed by the characteristics of light and its effects to the interior space.

Lighting conditions throughout the day showcase how shadows are cast upon the different building materials. The colored reflections highlight the imperfections and intrinsic qualities of the building materials.

For example, the resulting ceiling reflection illuminated a concrete knob in blue on the east wall. Ordinarily, the knob would be unseen without carefully looking at the building material. However, the stained glass gave new light to the concrete material; making small imperfections such as the concrete knob, noticeable. These ordinary conditions of the world become a catalyst for a response that enhances the conditions of the interior space.
Beginnings: Color Study

The beginning of this project began by gaining a comprehensive understanding of color theory that would serve as a foundation to the thesis. By studying color, sensible knowledge of the effects of color and aesthetic judgment were used to inform decisions in the design phase.

Early studies were enhanced by Josef Albers’ *Interaction of Color*.

Through studying the book, color theory was tested by using stained glass tiles illuminated over a light box. Glass tiles were painted different colors to test lighting, luminosity, and color schemes.
**Color Surrounded**

Color is perceived differently when surrounded by different colors. Colors should be carefully placed next to each other, ultimately giving balance to the composition.

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**Color Separated**

Colors can change due to the proximity of other colors.
Value

When color is grouped together, the darkest and lightest values can be discovered, making placement of colored panels important for a compositional balance. Through overlapping colors, different values can occur at a higher intensity.
Color Overlapped

When overlapped, different hues of colors are revealed. These overlapping colors can create differences in values.
Warm/ Cool Relationship

The colors red and blue were chosen for the study to represent warm and cool colors. By exploiting the intensity of each color, the temperature of color can change.

Spectrum

Through the process of staining glass, different hues can be created, ensuring that the installation can be composed of bright and dark colors.
Primary Colors

Primary colors and their hues can create different values of colors that are necessary in a composition. In this case, blue became the most prominent color used in this study.

Color Pyramid

The color pyramid is a tool used to evaluate color schemes. Different color schemes can convey different meanings through use of “warm” or “cool” colors and primary colors versus their complementaries.

Color Theory

Different systems within the pyramid can represent colors that can be used together in a composition.
Color Interval

When color is adjacent to one another, darker colors and brighter colors become the most prevalent in the composition.
Color Schemes- Monochromatic

Color Schemes were investigated through different values of colors. Composition was tested between placing tiles separated from one another, adjoined, and overlapping. The following became studies of looking at composition and balance in the installation using hues of a single color.
Color Schemes- Polychromatic

Different colors were used in creating a composition. Balance brings harmony and order to the composition by carefully selecting colors and their placement next to each other.
**Color Dominance**

This study looks at how color can change due to the dominance of surrounding colors. Once again, balance is integral for the color composition.

Artistic mediums is represented in colored pencils and watercolors.
Colored Interventions

The design moved in a new direction, now being visualized as a reality.

The project now focused on taking an existing space and intervening with a stained glass installation at the Cube at the Research + Design Facility.

Completed as a Thesis project in 2014 by Ryan Seavy, the Cube was chosen as the installation space to make visible the transforming qualities of light already present in the interior. The stained glass intervention helps to reveal the movement of the sun and the shadows cast from the overhead ceiling and south wall.

The kinetic nature of light within the Cube transforms the quality of the space with the movement of the colored light enhancing the latent qualities of how light affects the interior space.

Documentation was required to understand the space through photography. Afterwards, the pursuit of a colored intervention began.
Color Planes

Color studies were once again reintroduced in the project, highlighting the lighting conditions within the space.

These studies look at how stained glass interacts with different planes of glass and the resulting reflection that occurs.

The notion of reflectivity is also investigated by looking at how color is reflected on different materials.
Cube Model

After looking at the stained glass effects on the interior of the Cube, a 1 1/2” scale model was completed to test several design iterations in the sunlight. By orienting the model to true North, shadows in the model became a realistic predictor of how the resulting designs would look within the interior.

The model was built to emulate the different building materials used in the construction of the Cube, providing realistic examples of lighting conditions and garnering an understanding of the results of what a full scale installation would produce. Different patterns focused on creating a compositional balance of rhythm of the colored panels.
Shadow Testing

In order to fully comprehend the interior space of the Cube, shadow testing was completed to show how shadow would impact the space.

Tests were completed in Revit to show the shadows from the south wall and the ceiling, predicting how the stained glass would reflect in the interior.

Ceiling Shadow Timeline - March 30th
South Wall Shadow Timeline - March 30th

8 A.M.

9 A.M.

10 A.M.

11 A.M.

12 P.M.

1 P.M.

2 P.M.

3 P.M.
**Design Solution**

After looking at several iterations, a design scheme was decided upon.

The discernment of the design was formulated from the sensible knowledge and aesthetic judgment learned through the earlier color theory tests.

Though there were many choices in the design of the ceiling panels, regularity was chosen as the primary design determinant. Aesthetic responses from science lead to this point, predicting the relationship of light and space in the interior. Learning the medium of stained glass and its effects helped to gain an understanding on how light would pass through the material.

The resulting design focused on polychromatic ceiling panels that cover the length of the ceiling. Rhythm was focused on by providing staggered rectangular colors within the panels, resulting in natural light to also reflect onto the wall.

The south elevation of the wall was developed to cast a monochromatic blue shadow on the walls and floor of the Cube. Monochrome blue was chosen to balance the polychromatic colored light being reflected from the ceiling. The reflections from the glass ceiling or south wall will not touch throughout the day, resulting in two types of colored shadows interacting with each other in the daylight. One shadow being produced from the horizontal plane of the ceiling, while the other produces a shadow from the vertical south wall.

The glass panels on the south wall were also developed to allow natural light to shine through the vertical surface plane. Letting natural light into the design schemes allows for a visible connection between the ceiling and wall installation.

The regularity of the colored rectangles of the ceiling panels connects to the irregular placement of the ceiling lattice. Rhythm and composition of the ceiling panels allow for a structured design scheme.
Ceiling Plan
South Elevation
Fabrication

After a design scheme was chosen, fabrication of the glass panels began using plexiglass for its lightweight quality.

After each panel of plexiglass was cut, the glass was measured and taped off where the colored rectangles would be painted on.

The colors were painted and the process repeated on the other side of the panel.

The process continued by making a wood frame for the plexiglass to attach upon on the south elevation. The wood was cut, sanded, and stained black.
Installation Process

Once the ceiling panels were fabricated, the panels were installed within the ceiling of the Cube by sliding into place.

The panels were secured with a cable system to prevent panels from lifting in high-wind scenarios.

The south facade panels were installed by attaching a wood frame to the preexisting lattice. The plexiglass was then attached to the wood frame.

The following pictures are from the installation process.
Vignettes From the Colored Cube: A Time Lapse Video

The kinetic nature of the space is documented to show how the colored reflections interact with the interior of the Cube.

The following are pictures of the movie reel made in iMovie.
Poetic Imagery

After visiting the space several times after the installation, the space became a place for reflection and a realization of the daily presence of light and shadow affecting the interior.

The following poems reflect on different experiences from visiting the Cube and being surrounded in a room of color.
The Whistle

The whistle, the whistle.
Oh can’t you hear that whistle?

The sound surrounds me
Transcending me to another place,
Like the whistle of a train getting ready to depart
for a foreign land.

But as I look up, and see the colored ceiling
I know I have departed from the world around me
and entered into sanctuary.
Blue

Blue, the color of the ocean
Blue, the color of the sky.

Blue, the color from the space that surrounds me.
Blue, the color that steadies my soul.
The color that makes me feel whole.

Blue, the color that becomes me.
Space

Space, so small and yet so big.
Space, so blue it transcends.

Space, that contrast from the dull into a world of color.
Space, the feeling of being whole.
Realization

Austere, cold, and industrial.
Never could I imagine finding my inner purpose,
In more ways than one.

Blue, luminous, reflective.
Never would I imagine finding sanctuary
in an unsuspecting place
Such as an oasis in a desert.

Awakened, purposed, whole
Never would I imagine
Never would I imagine
The feeling I receive after finding myself in a room so blue.
World of Blue

In a world of blue, I find myself
Not in the depths of the ocean
Nor the heights of the sky
But steadied upon the earth’s surface.

I find a safe haven to think, to search, to know
I look around in this room of blue and have trouble placing myself
As if I am a foreigner but in a familiar place.

In this room of blue, I think to myself, how beautiful.
How mysterious.

I thought I knew of the color blue before.
But now it is a friend who keeps me companion
Like a friend you have not seen in a while.

I look out and see the sky in the distance
Pane after pane, the color blue brings me closer to my spiritual being.
To a place so familiar but yet so foreign.
Conclusion

In conclusion, the stained glass installation at the Cube served as a color intervention to help bring out the lighting qualities of the interior.

Light and shadow occur on a daily basis. However, this natural occurrence becomes intrinsic to the human eye. The stained glass interior highlights this natural occurrence. The result becomes a charged interior space that has existing conditions of the world. The sun moves and shadows fall constantly thought the day. The colored reflections help to highlight these conditions in the interior and bring them out from the gray and unnoticed. These ordinary conditions enhance the space and the building materials.

The colored reflections changed the way light and shadows were thought about in the space. In particular, the shadows from the ceiling and the wall never meet. Instead they counterbalance themselves and the project can be seen as an intervention of complementarity.

Color complimented the gray of concrete, light complimented shadows and the reflections, and monochrome blue is balanced from the polychromatic ceiling design. All of these resulted in dynamic installation that focused on highlighting color arrangement and the spatial relationships of color to the sensible qualities of the interior.
Appendix A: List of Images

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All images and photographs are produced by the author, unless stated otherwise.

*Fabrication and Installation Photos were photographed by Brian Chanda, Amanda Schafer, and Scott Gartner.

Appendix B: Sources


Appendix C: Vignettes From the Colored Cube, Time Lapse DVD