Beyond Style: Digital Investigations in Urban Architecture

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Creative Interventions

An urban project has inherent issues that impact on the premise and process of the design investigation, as well as the use of computing. The site for the Urban Issues Studio is Northside, a designated historic business district in Cincinnati, Ohio; one of only two business districts to receive this designation in the city. There are many restraints in working with historic urban architecture and digital media. Historic District Guidelines place restrictions in regard to what is an acceptable intervention in a designated historic area. In areas of urban decline, empty store fronts raise concerns about economic feasibility and use. Context is an important consideration due to the close proximity of buildings in an urban site. The dynamics of urban revitalization and the constraints of working in a designated historic district raise many issues relating to context; the degree of intervention and whether to replicate, emulate or interpret the historic context. These issues also suggest ways in which to incorporate the computer as a means of design investigation.

Contrary to a popular assumption, complete freedom is not a necessity for inventiveness. Research on creativity indicates that "constraining options and focusing thought in a specific, rigorous and discerning direction" play an important role in creative thought.[1] The key is a balance of structured and discursive inquiry that encourages a speculative, free association of ideas. Tim Berners-Lee, one of the creators of the World Wide Web, likened creativity to a weblike process that is nonlinear but also not random; which when placed in an environment rich with information will float ideas so the mind "can jiggle them into an insight."[2] Geoffrey Vickers in his essay, "Rationality and Intuition," described this symbiotic relationship as "...two functions which in practice are never wholly separated but which are, nonetheless, logically distinct as two reciprocating phases in a recurrent process of mental activity."[3] The rational is formative and intuition is generative; both are essential to creativity.

The Urban Issues studio uses ideation and analysis as vehicles to address the relationship of idea and the means of expression. *Ideation* is an ideographic process based on a method used in poetry in which visual ideograms or pictographs are the starting point for generating expressive words and concepts for a writer. In architecture, ideation involves identifying words or concepts as the starting point for generating a visual ideogram to represent an architectural idea.[4] These words or concepts can come from many sources: the seminar readings/discussions, an analysis of prototypes, a work of literature, etc. The point of this process is to develop the ability to identify appropriate concepts and to interpret the ideas visually as forms which evoke, rather than illustrate, the concepts architecturally. The focus is to develop architecture that is culturally significant and relevant, rather than to superimpose a specific style regardless of whether it is appropriate to the situation. Computing is used to create a construct of the intended reality that involves the relationship between visual expression and perception. The role of the computer in the studio is to enable the designer to generate meaningful architecture that would not be as readily created using conventional methods.

The studio consists of three components: seminar, computer applications, and design projects. A seminar during the first seven weeks of the studio focuses on perception, cultural geography and urban issues, as well as information about the neighborhood. Tectonic color studies and kinetics are explored via an iterative process to integrate the teaching of computer applications with design investigation as well as to address the contextual implications of the facade upgrade and adaptive reuse design projects. The studio projects include facade upgrades and adaptive reuse proposals for the three-block area from Knowlton's Corner to Jacob Hoffner Park. Digital media is used to document and present field trip observations, tectonic color studies, facade upgrades and adaptive reuse proposals as booklets, project boards and animations. (insert Figure 1 here)

Urban Issues

The seminar provides a forum for discussing a wide range of issues that pertain to the streetscape and architectural renewal of an urban neighborhood. Northside was the largest shopping area outside of the downtown business district until the 1970's, when the dynamics of urban change that happened in many US cities started this neighborhood business district on a path toward decay and abandonment. The Northside residential area also underwent a similar decline during which many of the single-family homes were converted to multiunit rentals. In the 80's, however, the residential area began to be revitalized. During this time period, there was a resurgence of interest in living in urban neighborhoods. The quality of the turn-of the century housing stock, plus the close proximity to the University of Cincinnati and to downtown, attracted people to live in the Northside residential area. The business district, however, did not keep pace with the residential revitalization. Although approximately one-third of the buildings in the business district have been reno-

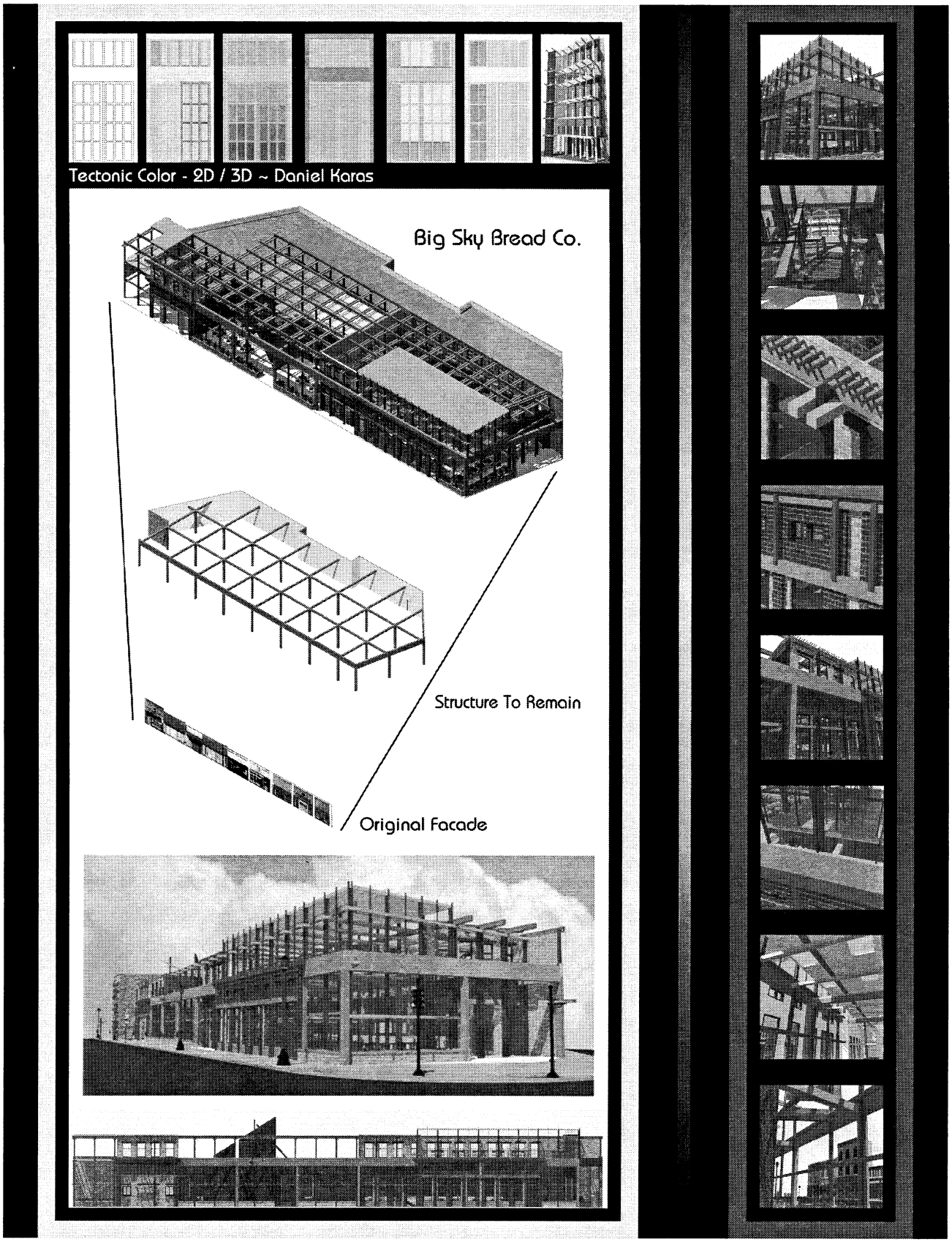

Fig. 1. Knowlton Corner: Tectonic Color Studies, Facade Upgrade & Adaptive Reuse Project by Stephen Dillon, Daniel Karas & Scott Sherry

vated and contain vital businesses, the remaining buildings are either empty or underutilized and need major renovations.[5]

During the past five years the business district has started to be revitalized, in part buoyed by the residential area. Many of the residents that bought houses during the 80's and early 90's in Northside have stayed in the neighborhood. What was once seen as a transitional area of *starter* homes and *fixer-upper's* has been stabilized by residents that have decided to make Northside their home. They have continued to upgrade and renovate their homes; even *moving-up* to larger houses in Northside instead of relocating. Some residents have also bought buildings and started businesses in the neighborhood. The city has joined this renewal effort. A major streetscape upgrade is underway with new street lamps, sign posts, brick paving and limestone curbs. Jacob Hoffner Park located in the center of the business district is also being redone and a grant is helping to underwrite the cost for business owners to upgrade their building facades.

The seminar readings on perception, cultural geography and urban issues include a range of topics and viewpoints, some of them contradictory, in an effort to raise questions and issues, rather than provide a prescriptive point of view.[6] Perception introduces the students to the architectural issues of composition, space, scale, inside/outside, order/disorder & color theory. Cultural geography addresses ways to *read* the urban landscape in terms of wealth, history, aesthetics, place, ideology, problems and artifacts. The viewpoints of Jane Jacob and Le Corbusier on urban issues raise divergent approaches to streetscapes. Newpaper articles and publications about the neighborhood give an overview of the history and current state of the business district.

A field trip to the studio site and related neighborhoods occurs after the seminar readings and tectonic color studies are completed. During the field trip the students take photographs, make sketches and notes about issues relating to the studio projects and talk to people in the neighborhood - e.g. business owners, residents. Possible businesses are proposed for the empty storefronts as part of the facade upgrades, which also facilitated a better understanding of the dynamics of the neighborhood as a whole by the time work began on the adaptive reuse projects. The students write their own building programs based on the readings, ideation studies and field trip.

Digital Media

How and when to integrate computer applications in the design process also have significant pedagogical implications. The time required to learn how to use a computer effectively affects the choice of technology, the complexity and number of design projects. However, guided by a process that reveals but does not dictate expressive functional form, these constraints become catalysts, rather than impediments, to a creative approach to design.

The use of computer equipment / applications is taught on a *need-to-know* basis in the studio to address the design issues and the tasks at hand. Thus ease of use and a short learning curve are imperative concerns; especially given the number and variety of software applications involved in the Urban Issues Studio. The choice of software and instruction are carefully orchestrated with each investigation so that design is the driving force of the studio. The projects were done on PowerMACs using ArchiCAD, Photoshop, Pagemaker and Playback. The primary introduction to computer applications occurs during the beginning of the term for the 2D/3D color studies and the facade upgrades. However, demos continue throughout the semester as issues come up in the design projects.

The computer was woven into the design studies as outlined below:

2D - Digital cameras to take photos of prototypes; Scanners to scan in drawings of prototypes; Desktop Publishing to edit the digital photos and create line drawings of the architectural examples as templates for the 2D color harmony studies: grids based on windows, grids based on masonry patterns and hierarchical patterns based on architectural elements - i.e. columns, brackets, etc. & to compose layouts of the 2D color studies in a booklet.

3D - Introduction to CADD to create 3D interpretations of

Fig. 2. Northside Business District Facades: Existing

the 2D color studies and to document the studies in plan, elevation, perspective and axon views; Desktop Publishing to compose the 3D color studies in a booklet.

Facade Studies - Uses all of the previous computer applications: digital cameras, scanners, desktop publishing photoediting/ layout and CADD applications to create and present individual facade studies. Introduces the use of materials and textures (texture-mapping), not just local or flat color.

Adaptive Reuse - Uses all of the previous computer applications from the Facade Studies to do a complex group project. Introduces the use of animation, or walk-throughs, to understand a project as it is being designed as well as to present the final project for reviews and the exhibit.

The creation of still images and animations is linked in ArchiCAD, which reduces the learning curve and simplifies the process. The students learn how to place cameras to render images when they do the Tectonic Color Studies and the Facade Upgrades. A walk-through animation simply connects the cameras and renders the scenes (i.e. frames) in between the cameras. A VR automatically shoots and stitches together frames in a 360° circle. It is also possible to create still images and walk-throughs at various levels of rendering from shade and shadow to texture mapping. This enables animations to be used very early in the design stage to get a sense of what it would be like to be in the space and make corrections (shade & shadow), as well as a final presentation (texture-mapped photorenderings). Thus the use of computer equipment and applications is not the end in itself - it is a vehicle to creating, understanding and presenting an architectural project from the viewpoint of the occupant.

Tectonic Color

Color is an integral aspect of the design process in the Urban Issues Studio. We live in a chromatic world. Color is especially useful for developing designs that relate to the context of the buildings around them. However, color is more than the mere dressing of a form after the fact; it has its own inherent logic and expressive potential on the conceptual origin of a work of architecture, its formal tectonics and material integrity. Color, material and forms are the physical manifestations that inform our perception and concurrent understanding of a work of architecture. Kenneth Frampton refers to tectonics as the "poetics of construction," a concern with both the revelation of constructional technique and expressive potential.[7] Tectonics does not favor any particular style, it facilitates connections regardless of style; an issue of particular importance for urban contexts. Tectonics deals with the constructive arts; the relationship of the parts to the whole via composition (elements and relationships), structure (formal and physical), and space (field and volume). Color harmony identifies effective relationships. Tectonic color incorporates the compositional, structural, and spatial aspects of color harmony with its conceptual and material expression in the construction of our visual experience.

The tectonic implications of color expand the expressive dimensions of material and form which links *construct* and *content*. For example, monochromatic color (single color) emphasizes the *uniformity* of the parts of a composition; analogous (related colors on the color wheel - e.g. red and red-orange) express a kindred *similarity*; complements (opposite colors on the color wheel) generate a *distinction* of opposing forces; and single-color extension (one discernible color against a field of visually achromatic hues) *isolates* an element of hierarchical importance.[8] This has both conceptual and formal implications. Tectonic color harmony addresses relativity - the issue of relationships, layers of information and making connections; in other words, one element has an impact on another. This develops a way of thinking, understanding and developing architecture which is more holistic: form, function, materiality, content, and context are not isolated issues; they are a part of an integral whole.

Tectonic color studies integrate ideation and computing as an intentional design strategy and form generator for architecture in the Urban Issues Studio. Design computing enables the com-

Fig. 3. Northside Business District Facades: Proposed upgrades from left to right by Jonathan A. Sladek, Nilay Deshmukh, Kim M. Riesterer. Ron Wetzel

position and structure of space / form to be discovered simultaneously and relationally with the phenomena of color, to generate and visualize an idea as form, and to represent form as experience. The tectonic color studies establish a visual vocabulary for the architectural projects and introduce the students to all of the computer applications that will be used in the facade upgrades and adaptive reuse projects. The integration of color theory and computing guides the design with knowledge that does not dictate the result, but rather generates an integration of form and idea that transcends the notion of prescribed style.

One of the underpinnings of the studio is to observe the world in which we live. The initial 2D-3D color studies encourage students to *look* at the world around them, instead of operate on assumptions. The first series of color studies integrates an introduction to desktop publishing (digital cameras, scanners, page layout and photo editing software) with 2D tectonic color. The goal is to break habits of perception that rely on color shorthand (i.e. the sky is blue, grass is green) by on-site observations of color and light effects. Two-dimensional black-line drawings and achromatic presentation models are still the primary mode of design generation and representation in architectural design studios. The rendered perspective is an exception and is usually done as a final design presentation drawing. These traditional methods deny the chromatic, three-dimensional realm of architecture as a part of the design process. The immediacy with which color and composition can be manipulated with a computer encourages experimentation and extends a general study of color and composition to the specific concerns of architecture. Students can quickly see the impact of their design decisions and revise the project.[9]

The first series of design studies uses tectonic color to analyze and develop 2D patterns three-dimensionally. The patterns are derived from architectural details - grids (masonry & windows) and an architectural element . After a demo on the use of digital cameras, the students get out of the studio and find six patterns in the built environment: 2 grid patterns in windows; 2 grid patterns in masonry, concrete masonry units (cmu) or stone; and 2 hierarchical patterns in architectural elements. Demos on scanners and Photoshop enable the students to edit the digital image so it can be traced as a line drawing in Photoshop. This provides the template for the tectonic color studies which interpret each pattern as two-dimensional compositions in monochromatic, single-color extension, analogous, complements, and complement-split color harmonies. (insert Figure 4 & 5 here)

Demos on ArchiCAD dealing with color, materiality, texture mapping, natural and artificial light, 3D modeling and camera views introduce the 3D Tectonic Color projects. The six patterns from the first study are reinterpreted three-dimensionally in ArchiCAD in elevation and section as well as in plan. This approach helps break the habit of designing only in plan extrusion that is inherent in many CADD programs as well as in traditional board drafting. The process of *what if* and the ability to distinguish *know how* from *know why,* referred to earlier is reinforced in the 3D studies by restricting the color harmony, or *kit of parts.* Each pattern is interpreted three-dimensionally with the same color harmony for all six studies to explore another implication of tectonic color on design development. The 2D studies incorporate a wide range of color harmonies as content for designing different constructs for each pattern. The 3D studies reveal the impact of a single color harmony as content for different constructs. This helps students understand the relationship of the parts to the whole, from different points of view and in different contexts that is integral to meaningful design.

The Tectonic Color Studies accomplish several things. The 2D studies introduce the students to the compositional implications of color. The iterative ideational process also encourages them to look at the world around them for inspiration, not via mimicry but through a process of analysis and interpretation which links construct and content. The 3D studies extend the tectonic properties and perception of color in two-dimensional composition to the three-dimensional realm of architecture. At the completion of this series, the students have also been intro-

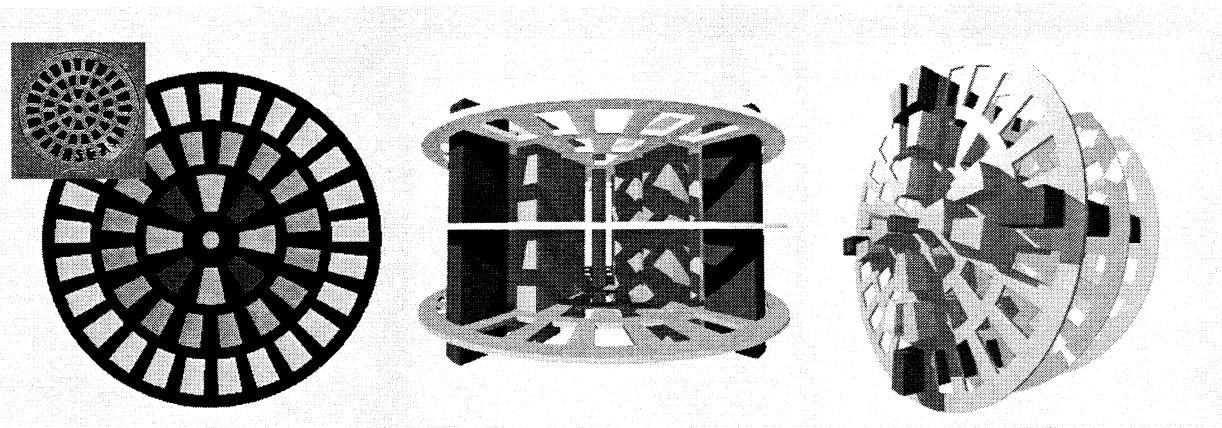

Fig. 4. Tectonic Color Studies: Single-Color Extension isolates an element of hierarchical importance. Grate Interpretations by Michael J. Lubbers

duced to the basics in all of the computer applications and hardware that they will need to do the facade upgrades and adaptive reuse architectural projects.

While the tectonic color studies could be taught in a separate introductory course on design media or theory, this approach is not as successful as incorporating the studies into the design studio process. Taught as an isolated course, students are usually not as motivated to learn either the computer applications or the design theory. They do not see, or perhaps understand, the immediate use of an issue to their design projects unless it is reinforced in the studio. Students often need a guiding hand to help them resolve a problem with using the computer or color during the design process. Due to the work load inherent in architecture programs, if an issue is not incorporated as a part of the design project, the majority of students do not have the time or motivation to include additional material from another course. Integrating the tectonic color studies into the studio as a knowledge base for the architectural projects reinforces an iterative process that results in more meaningful design.

Inhabiting the Artifact

The transition from architectonic constructs to an architectural project raises several issues; particularly the impact of scale, function and context. The 2D and 3D tectonic color studies help guide the development of the facade upgrade and adaptive reuse projects. The color studies remain pinned up in the studio throughout the term as a reference to encourage the spirit of the theoretical constructs to inform the architectural projects. The iterative process of investigation in the tectonic color studies is also used in the development of the architectural projects. Each student upgrades two facades; one as a minor intervention and the other as a major intervention. These studies are followed by group projects, in which a facade upgrade is revisited and developed further as an adaptive reuse project. The Historic Guidelines for the Northside Business District require that new work be compatible to the original, but stress that imitation of old work in new construction should be avoided.[10] This approach to the historic integrity of the architecture allows for design interpretation rather than replication.

The exploration of compositional, spatial and human scale is particularly relevant to the facade upgrade projects in dealing with context and experience. The issue of scale is introduced in the tectonic color projects and reinforced in the design development and presentation of the architectural projects. Compositional (elements and relationships) and spatial (figure and field) issues of scale inherent in the tectonic explorations of color inform the development of the facade upgrades. The facades in this studio are not designed as isolated entities. The compositional and spatial implications of tectonic color provide a vehicle for developing an elevation which also relates to the adjacent context. The implications of human scale are also important. Although the elevation studies are designed as constructs that relate to the context of the adjacent building, the facades are experienced from street level. (insert Figure 6 here)

The adaptive reuse projects are empty buildings in need of major upgrades and in significant locations. All of the adaptive reuse candidates are discussed by the group during the field trip. Following this discussion, students work in groups to document more thoroughly the potential adaptive reuse proposals - as well as the facades of the other buildings for minor/major upgrades. The decision as to what buildings are developed as adaptive reuse projects and who works on which project is made after the field trip and the major/minor facade upgrades are completed. This process encourages developing the adaptive reuse projects as a part of the fabric of the entire neighborhood, instead of as an isolated entity. The group efforts (i.e. the seminar discussions/readings, documentation of the site/ projects before deciding which part each student would address, design teams for the adaptive reuse projects) made the studio more cohesive and encouraged collaborative efforts.

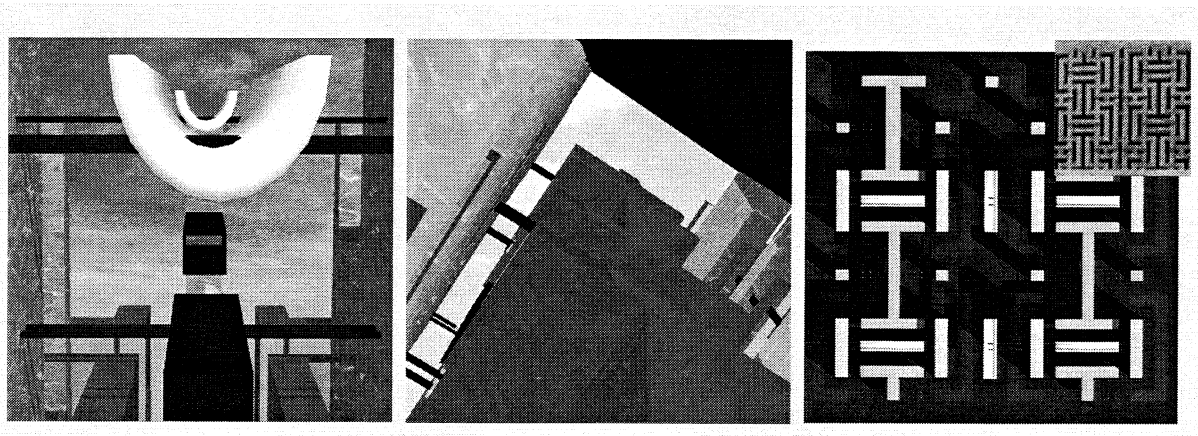

Fig. 5. Tectonic Color Studies: Complements create a distinction of opposite elements. Window Grill Interpretations by Kevin Teague.

Percept vs. Precept

It is important to distinguish between the computer image and architectural understanding. The initial impact of digital media on architectural design has been the ability to render the look of a final project or to create shapes that reflect the facility of the tool. Digital media also provides a *forum* for understanding the implications of visual expression and design intention as virtual constructs of the experience of the intended built reality. Computing offers the potential to enhance the creative aspect of design. In order to do so, it is crucial that design ideas and computing reinforce each other, rather than be competing issues. Making design the focus of the investigation rather than technology requires interweaving computing with a creative process that embraces both discursive and directed inquiry.

Desktop publishing, computer modeling and animation are used in the studio to explore the experiential aspect of architectural design. Desktop publishing enables the presentation of projects as constructs to convey architectural concepts and experience. Modeling encourages an awareness of the implications of a design as a part of ideation and development. It integrates the tangible reality of tectonic color, light, and material in the design process as architectural ideas and form generators. Animation facilitates a critical review of the creative process and enhances the designer's ability to develop, as well as present, a project based on an understanding of the human experience. Animation is an important catalyst for design development. We understand and interact with architecture as much through movement as repose. Introducing animation early in the design process makes the adaptive reuse projects *come alive* for many of the students and enables a better understanding of a design proposal as a potential work of architecture.

The design of architecture is a creative act concerned with the expression of ideas through culturally significant and relevant form; issues which involve the ability to understand the relationships and implications of disparate issues as a part of the larger context. This requires the ability to distinguish *know how* from *know why*; to understand the relationship of the parts to the whole, from different points of view and in different contexts - the process of *what if* that is integral to meaningful design. Digital media is a vital link to facilitating this understanding in Urban Architecture.

NOTES

A special note of thanks to my students in the Urban Issues Studio (1997-98) that I taught as a Visiting Faculty Member at the University of Illinois-Urbana/Champaign. Their enthusiasm and hard work were instrumental to the success of this investigation.

1 Natalie Angier, "Route to Creativity: Following Bliss or Dots?" *New York Times* (September 7, 1999): Section D 3.

2 Steve Lohr, "A Parent's View of the World Wide Web as It Reaches Adolescence." *New York Times* (September 20, 1999): Section C1-2.

3 Geoffrey Vickers, "Rationality and Intuition," in ON AESTHETICS IN SCIENCE. Ed. Judith Wechsler (Cambridge, Mass.: MIT Press, 1978): 157

4 For more information on the ideographic process in 1) Writing - Ezra Pound, ABC of READING (New York: New Directions, 1960): 53; 2) Architecture - Darlene A. Brady and Mark M. English, "Creativity: The Virtual Process of Metaphor," *Structurist* 33/34 (1993/94): 39-42.

5 Synopsis of Northside based on: "Now the secret's out: City neighborhood is a house-hunter's paradise." *Cincinnati Enquirer* (December 8, 1997): Section B 1-2; NORTHSIDE; A WALK THROUGH NEIGHBORHOOD HISTORY. (CINCINNATI: NORTHSIDE COMMUNITY COUNCIL, 1990:: 24 p.; Urban Renewal Plan: Northside. (Cincinnati: Dept. of Economic Development, 1996): 88 p.

6 The seminar readings on perception, cultural geography and urban issues include selections from the following: Rudolf Arnheim, DYNAMICS OF ARCHITECTURAL FORM (New York: Van Nostrand Reinhold, 1977); Darlene Brady and Mark M. English, "Architec-

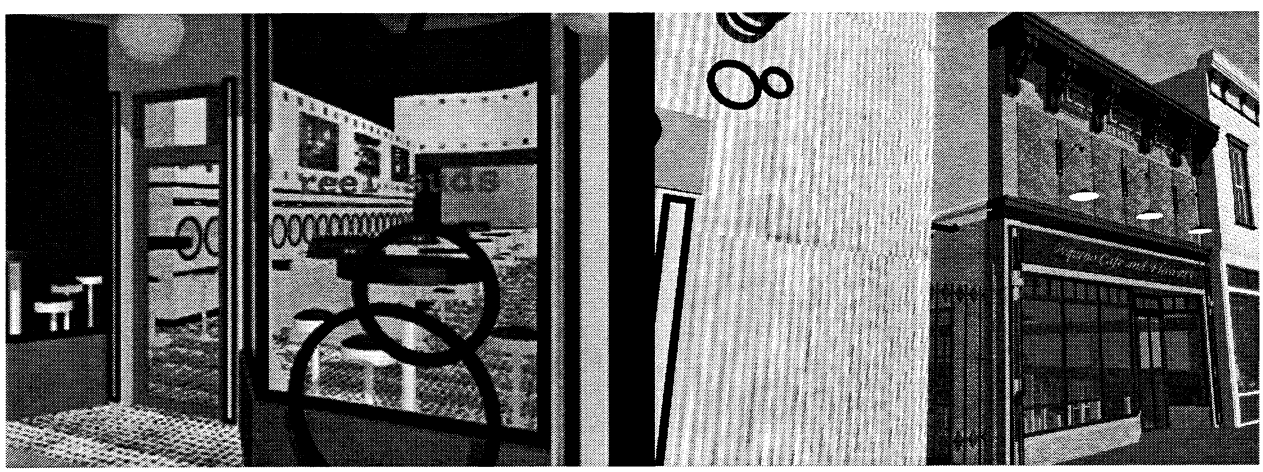

Fig. 6. Adaptive Reuse Projects: Left -Okrent's Reel Suds by Jill A. Lauterbach, Kim M. Riesterer & Michael J. Lubbers; Right-Pequeno Cafe and Flowers by Eric Hampshire, Claudia Rodriguez & Ron Wetzel.

tonic Color: Composition, Structure and Space," *Structurist* 31/32 (1991/92): 89-95 and "Color" *Inland Architect* 37/2 (March/April 1993): 42-45; Charles Moore and Gerald Allen, DIMENSIONS: SPACE, SHAPE AND SCALE IN ARCHITECTURE (New York: Praeger, 1974); D. W. Meinig, THE INTERPRETATION OF ORDINARY LANDSCAPES: GEOGRAPHICAL ESSAYS (New York: Oxford Univ. Press, 1979); Jane Jacobs, THE DEATH AND LIFE OF GREAT AMERICAN CITIES (New York: Random House, 1961); Le Corbusier, TOWARDS A NEW ARCHITECTURE (London: Architectural Press, 1946) and WHEN CATHEDRALS WERE WHITE (New York: Reynal & Hitchcock, 1947).

[7] Kenneth Frampton. STUDIES IN TECTONIC CULTURE (Cambridge, MA: MIT Press, 1995): 2.

[8] For further discussion of tectonic color see: Darlene. A. Brady "Poetics, Color & Kinetics: Content & Computing," ADVANCES IN SYSTEMS RESEARCH AND CYBERNETICS, Vol. II G.E. Lasker and G. Andonian, Eds. Windsor, Ontario: International Institute for Advanced Studies in Systems Research and Cybernetics, University of Windsor, 1998. pp. 81-85, illus.; Brady and English, op. cit. *Structurist* 31/32 (1991/92) and *Inland Architect* 37/2 (March/April 1993).

[9] For more information about color graphic computing see: Richard B. Norman, ELECTRONIC COLOR (New York: Van Nostrand Reinhold, 1990), 186 p.

[10] Historic Conservation Office, NORTHSIDE NBD HISTORIC DISTRICT GUIDELINES (Cincinnati: City Planning Dept., May 1982):16