

Restructuring Cubist Narratives in Non-Linear Time

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The design of architectural environments through non-linear, abstract design techniques presents a significant opportunity for current architectural design theory. This paper explores time-functions in design, whether implied or actual, that are potentially interchangeable, and that are at least partially translatable between painting (implied) and film (actual). The founding theory is rooted in the convergence of two turn-of-the-century inventions: Cinématographe (1895), and Cubism (Picasso and Braque, 1906). A century later, the development of inexpensive digital tools facilitates essential capabilities in the application of time-functions in architectural design: the virtual simulation of dimensional space, and a practical approach to non-linear video editing.

Keywords: translation; restructure; video; non-linear; Cubism.

Abstract Origins of Time Theory in Architectural Design

This research and its associated pedagogy explores the potential benefits of video diagrams, *memory diagrams* (Flanagan, 2001), in contemporary architectural design practice—a time-enhanced design alternative to the abstract, collage diagrams whose static compositional approach largely defined twentieth-century architectural design practice. The invention of collage in the century's second decade, "...cemented the bonds between architecture and the Fine Arts; for architecture also contains no inherent distinction between its quality as a work of art and the formal elements of which it is composed." (Collins, 1967) The static, abstract nature of collage permitted architecture to maintain its ongoing association with the avant-garde arts for most of the twentieth century, most notably in the Bauhaus. Regardless of the approach employed, twentieth-century design theory in architecture rarely strayed from the philosopher

Goethe's maxim, "architecture is as frozen music."

The legendary architect Le Corbusier's elimination, then reintroduction, of time in his design practices illustrates the complexity of incorporating an additional dimension variable in the design equation. "[I]n 1919, Ozenfant and Jeanneret (who had not yet adopted the nom de guerre Le Corbusier) specifically attacked as 'absurd' the concept of four-dimensionality in painting. In their Purist manifesto, *Après le cubisme*, they gave the lie to Giedion's interpretation of Le Corbusier's work as an expression of the space-time continuum: When you think about it, the objection raised here towards the fourth dimension only concerns the gratuitous hypotheses of the Cubist theorists; this particular hypothesis has no foundation in palpable reality and, as it is impossible to express it in painting, only adds to the general misunderstanding. In a word, this is why it is absurd when they claim to be able to express any dimensions other than those we can perceive with our senses." (Padovan, 2002)

Le Corbusier rejected Cubism, deriding it "...a dec-

orative art, a romantic ornamentalism" (Eliel, 2001). Instead, he embraced Purism, an abstract compositional technique through painting "... [that] derives the intrinsic qualities of plastic elements and not from the representational or narrative potential" (Eliel, 2001). In practice, Purism was a heretical deviation from Cubism; most notably, it negated Cubism's *raison d'être*, the relativistic revisions of time and space in art. While Le Corbusier's use of Purism generated architecture of wide adulation, the elimination of time as a design variable later contributed to intractable design problems, most notably in his commission for the 1958 Brussels World's Fair, the *Philips Pavilion*.

For the external shell of the Philips Pavilion, Le Corbusier abandoned his Purist roots and adopted a sound-to-form translation scheme that employed frozen time as a design variable. Le Corbusier's interior spatial exhibit was a multisensory *electronic poem*, the product of a musical collaboration with the composer Edgard Varèse. While Corbusier stated focus was the design of the internal space, his design methodology and objective for the exterior form was unclear and ambiguous, quite contrary to the plastic assurances of Purism. Consequently, he subsumed the relativistic work of his engineering assistant Iannis Xenakis whose theoretical work established a transactional relationship between musical progressions for the generation of external form. "In accord with twentieth-century ideas of relativity '[t]he succession of tempered intervals is a geometric progression the duration will be a geometrical progression too." (Trieb, 1996). Corbusier's design paradox, the translation between spatial and experiential art, is that music exists in time and Purism as plastic space; they lack a common interchangeable dimension of perception. Despite squabbling over authorship, and the claim that the external form was less important, "In the end, the master did credit Xenakis as the co-author of the building's architecture..." (Trieb, 1996).

An Inverse Theoretical Proposition

This study examines the potential translatability of design intention, from design concept to architectural

reality, through a selective reconfiguration of Cubist and film compositions, to generate a design narrative to direct computer-generated design practices that have emerged in the beginning of the 21st century.

"The value of painting derives from the intrinsic qualities of plastic elements and not from their representational or narrative potential." (Eliel, 2001) This experiment applies the inverse logic of the previous statement by Le Corbusier's on Purism: that a Cubist-inspired concept diagram, through abstract narration and representation, can be constructed on a non-linear timeline in video, to guide the design development of a CAD-centric designer. It maintains Le Corbusier's premise from *Après le cubisme*, "that it does not aim to be a scientific art, which would have no meaning", and, "Art is above all a matter of conception." (Eliel, 2001) The value of this experiment is found in the means and methods of converting Picasso's 1937 painting *Guernica*, an abstract Cubist narrative on the horrors of war, into a time-based video narrative. The use of Picasso's *Guernica*, an exhaustively documented painting, allows the translation of message from painting to film to be the primary focus, rather than Cubist technique.

In the what-if scenario that follows the objective is to circumvent limitations inherent in the plastic art of Purism. Le Corbusier's rejection of time-aware abstractions in Cubism, in favor of the plastic space of Purism, is reversed. The Cubist convention of the interchangeability of space, form, and function is adopted and time is imbedded in the abstract representation of same. The new substrate for the non-linear narrative is video, a medium for communication that engages memory—rather than record a Cubist narrative as a reference document, the paramount objective is to imbed the multi-sensory experience of the video narrative in memory.

Origins of Cubism

"The Cubists created a system by which they could reveal visually the interlocking of phenomena. And thus they created in art the possibility of revealing

processes instead of static states of being. Cubism is an art entirely concerned with interaction: the interaction between different aspects: the interaction between structure and movement: the interaction between solids and the space around them: the interaction between the unambiguous signs made on the surface of the picture and the changing reality which they stand in for" (Burger, 1980).

The significance of Cubism to this study is the parallel address of time and space in science and art; Einstein published his Special Theory of Relativity in 1905, an event mirrored in art by Picasso and Braque's invention of Cubism, the symbolic representation of reality through Cubist technique. "The Cartesian division between body and soul" required a new way of thinking; "understanding became a question of considering all that was interjacent." (Burger, 1980) In essence, the turn of the century became a fulcrum built on the discovery of quantum theory, "showing the impossibility of isolating a single event ... [and] state that our relationship to that event is always an additional and possibly distorting factor." "Natural science [wrote Heisenberg] is not simply to describe and explain nature; it is part of the interplay between nature and ourselves; it describes nature as exposed to our method of questioning" (Burger, 1980).

Film, Cubist Narratives, and Architectural Design

The practical significance of Cubism to this study is its selective, symbolic treatment of dimensional space and time through selective dimensional filters. For instance, in the translation of Cartesian reality into a symbolic planar representation, linear time is suspended; space and time are re-represented in fragmented assemblages as symbolic narratives along a timeline.

Cubism restructures spatial and temporal events to create a graphic narrative, but "[a]rtistically, film is the medium which, by its nature, can accommodate most easily a simultaneity of viewpoints, and demonstrate most clearly the indivisibility of events." (Burger,

1980) It is the nature of non-linear film to precisely format, articulate, and deliver a complex narrative.

Picasso's Guernica

"On April 28, 1937 the Basque town of Guernica was destroyed by German bombing planes flying for General Franco." (Barr, 1937) "The fighters meanwhile flew low from above the center of the town to machine gun those of the civilians who had taken refuge in the fields" (Berger, 1980). Picasso depicted this horror and atrocity in *Guernica*, a work of intense personal anguish. The message in *Guernica* is of the universality of war and suffering, told through the medium of a visually interpretive Cubist narrative, and composed on canvas.

In *Guernica*, Picasso composes both event and meaning on a single plane. In the painting however, the message exists simultaneously, through the selective use of dimensions and fragments of time to form the visual narrative. Picasso's narrative warps the content of the canvas, as if a ribbon were threaded through events in time and memory, and then compressed onto the canvas. *Guernica*, one of the most famous and thoroughly documented paintings of the twentieth-century was chosen for the study that follows for its unique construction. The 7.8-meter mural is composed of discrete compositional elements that are assembled on canvas in a relational narrative, reminiscent of chapters in a book. Similar to a book chapter, each segment is semi-autonomous, but the entire canvas must be read to place individual statements in context. The ordering of the chapters is the responsibility of the viewer.

Guernica: Translating and Restructuring Space

Twelve architectural students participated in this fall 2001 translation study of *Guernica*. Students researched the stylistic origins and ensuing evolution of Cubism; they studied compositional techniques in the construction of short video narratives. Picasso and Braque

were the primary Cubist references, while Corbusier and his Purism theories was the primary architectural design reference. The project included the analysis, deconstruction, reconstruction, and reinterpretation of the painting along a film timeline. The premise is that time-functions in design, either implied or actual, are potentially interchangeable and at least partially translatable between painting (implied) and film (actual). The practical effect of this is that design concepts that are constructed in traditional collage technique can be more effectively constructed as digital narratives in three-to-five minute video compositions.

The Assignment: Evaluate the potential in translating the temporal space in Picasso's painting *Guernica* as a reconstruction on film. Consider *Guernica* as a *design diagram* of the artist's memory of the event (The Spanish Civil War). How is the spatial experience translatable from painting to film? What audio qualities would reinforce this message? What sensory qualities are translatable? Research your subject thoroughly and document your sources. Create your concept in a time-based exhibit (video demonstration) and document by storyboard. A literal translation is not the objective; restate the message, and evaluate the means and capabilities of translation.

The translation of *Guernica* from canvas to video engages three variables: the translation of the narrative into discrete elements, the sequencing of the spatial narrative into time, and the texturing of the narrative with sound. In an analogous description, the viewer records his or her reading of the narrative; the recorded sequence creates a stack of images selected by the viewer; and the event is recorded as a unique and repeatable experience.

The literal presentation of a stack of images will create a video collage; however, digital software allows its spatial reconfiguration. Jean Metzinger, the Cubist painter, in 1911 opined on cubism, "Formerly a picture took possession of space, now it reigns also in time" (Kern, 1983). Regardless of the Cubists' intentions, the medium does not employ actual time, that is a requirement of video technology. In addition to the requirement of a timeline, time may also be a factor in the spatial composition of the graphic media. Finally, sound is an added variable; it sequences and reinforces perception and memory. While the texturing of a video with sound is not the theatrical alternative of Le Corbusier and Varese's creation of an "electronic poem", the intended function of sound in memory is related. "I will not make a façade for Philips, but an electronic poem. Everything will happen inside sound, light, color rhythm. Perhaps, a scaffold will be the pavilion's only exterior aspect" (Trieb, 1996). In the following section is a description of the students' development of video delivery devices.

Guernica: Restructuring Time

The development of a video-based media delivery system is a design variable assigned in the reconstruction of *Guernica*.

The media requirement was to construct a video device for the delivery of an integrated graphic and sound message. In contrast to *Guernica* the painting, the resulting narrative is a non-linear, temporal dimension in the design process: a carrier.

Student Tom Sawyer's *Video Machine* incorporated many of the variables employed in the stu-



Figure 1
Cubist translation as spatial narrative by Brian Klatt, 2001.



Figure 2
*Memory Diagram and Video
 Machine by Tom Sawyer.*

dents' collective works. Sawyer's *Video Machine* was a ten-person black plastic viewing container with a video projector and mirrors. Sawyer's statement of intention: "The first sequence was a tranquil glance towards the history of the event with less personal emotional involvement, which musically foreshadowed the event to come. The second sequence brought the viewer into the actual event in a moment, which transcends time. Violently the viewer is brought into this event and altered through sound, imagery, and animation." Sawyer's *Machine* combined two sensory strategies: First, it saturated the senses with its sensory message, increasing its (violent) impact to the point of excess. Second, it made the viewer an involuntary participant in its message.

"*The Impact of War* is not an entertainment piece. The purpose is to allow you the experience of war with little if any truly physical harm, maybe some retinal damage. To talk of specifics the room was blacked out separating or dulling one to the external architecture that existed around us. Several (7) mirrors were delicately/dangerously hung from the ceiling. They were layered two-dimensionally in order to emphasize the initial geometry of the event. Distanced from the exterior wall, they related the viewer with an image of themselves and the event. Placed under the mirrors was an LCD Projector spaced from the ground in order to appropriately interfere with the viewer's ability to see the reflection of himself. *The Impact of War* was then projected onto the viewer against the wall. The sound was projected into the space and actually felt upon the

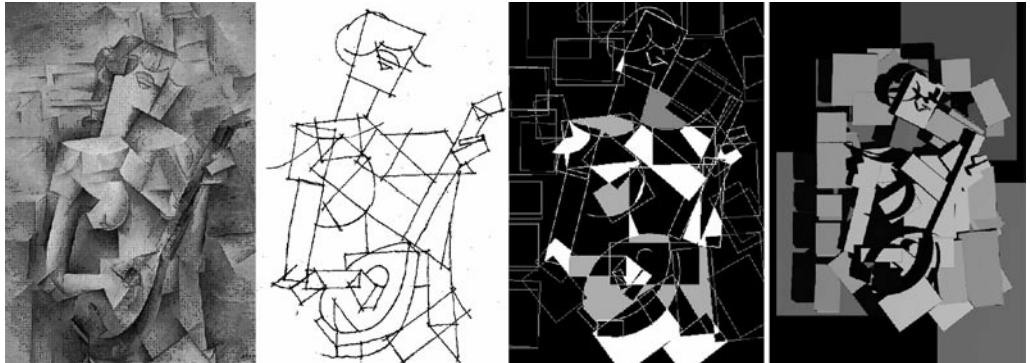
viewers back while touching the wall. As the event projected, the viewer was painted with the history of the event and eventually the actual event" (Sawyer, 2001)

Related Research: Principles of Memory Diagrams

Graphic Analysis and Translation in Time (single subject): The design logic of a 20th century artists is analyzed, digitally interpreted, and extended into three-dimensional space. It is recompiled along a timeline and memory and sound are incorporated as design variables. This related experiment preceded the Picasso project; it demonstrates the translation of the Cubist narrative into spatial diagram.

The deconstructed analysis of Picasso's 1910 *Girl With a Mandolin* by student Miranda Karli illustrates the advantages of a Cubist translation from painting to form in architecture. A constraint in this analysis is that only two primary shapes may be used to represent any given form; unrestricted variables are location, rotation, scale, depth, and orientation, and color (or image). These are also the properties of block variables in AutoCAD. For instance, a 1x1 square created as a reference block may be scaled as a rectangle, have any planar orientation, may be repeated as many times as necessary, and have attributes of thickness, surface, and color. The restriction to two primary shapes, along with the allowed variables, helps to manage the number of unique design conditions, as well as the manufacturing complexity necessary to fabricate and assemble the architecture.

Figure 3
Picasso's *Girl with a Mandolin*. *Memory Diagram* and *Translation* by Miranda Karli. (2000)



Platonic vs. Aristotelian: Competing Modes of Design Inquiry

The intersection of time and space, and earth, precisely formatted by twenty-four orbiting geosynchronous satellites, defines the conceptual thematic axes on which architecture has modeled the optimized function of its daily existence. Within this domain, the optimization of design and manufacturing processes has transformed the practice of architecture.

"The basic argument is that the digital age is forging a very different kind of architecture and, at the same time, providing unprecedented opportunities for the significant redefinition of the architect's role in the production of buildings" (Kolarevic, 2001). However, critics of conventional architectural design processes, particularly venture capitalists and the software developers that they underwrite, believe that advances in the digital revolution obviate the need to advance the traditional design paradigm. Autodesk, the world's largest architectural software developer states, "*Revit Building* improves how buildings are designed". "Design is an iterative process; you create a design and then change it, again and again." "*Revit Building* works the way you think, so that you can get back to what you love, designing buildings."¹ While Autodesk properly recognizes the utility of *Revit Building's* modeling, manufacturing, and visualiza-

¹ http://download.autodesk.com/global/revitbuilding/ADesk_IO51_OL/ADesk.51.html

tion capabilities, it errs by extrapolating its rational capabilities backward into the conceptual origins of the design process. As representative of an emerging class of building information management software, its capabilities need to be recognized and its deficiencies addressed.

The *Revit Building* software addresses these computer-aided design issues: documentation, location, position, scale, cost, maintenance, durability, code compliance, image, structure, assemblage, building trades, transportation, accessibility, efficiency, manufacturing, modularization, compatibility, lifecycle costs, security, efficiency, energy, utilities, and sustainability. Vision is the primary interface for design consideration, the validation of form, and suitability of image.

The *Revit Building* software does not address these conceptual design issues: sketches, drawings, photographs, narratives, precedent studies, context, design mandates, client preferences, neighborhood input, materiality, aesthetics, philosophy, accessibility, adjacent city, climate, social, age, environmentalism, style or theme, or ecology. *Revit Building* and its related genre of modeling software do not address the sensory attributes of touch, smell, sound, and light.

The design scenario advocated here is to accommodate both requirements by allowing modeling software to manage the practical aspects of simulation, validation, documentation, and manufacturing; and in a parallel process, allow *memory diagrams* to guide and inform conceptual design development

of the *Revit Building* model. The balance sought in this paper is found in Vitruvian logic:

"It follows, therefore, that architects who have aimed at acquiring manual skills without scholarship have never been able to reach a position of authority to correspond to their pains, while those who rely only upon theories and scholarship were obviously hunting shadows, not the substance. But those who have a thorough knowledge of both, like men armed at all points, have the sooner attained their object and carried authority with them." (Vitruvius, first-century BC)

Summary

The development of video narratives in memory diagrams requires the translation of elements of composition, previously developed in collage, into a format suitable to inform the rational processes of computer-aided design and building information management. The focus of this study is to identify and understand the requirements of translation, from planar representations, to temporal-spatial graphic narrations. The work of both Picasso and Le Corbusier, are foundational in this research; each presents compelling precedents for the work that they undertook. In this study, their theories create a benchmark for discussion, experimentation, and revision.

The translation of Picasso's Cubist compositions onto a timeline requires the segmentation and deconstruction of the painting and the stacking and reconstruction of the narrative in time. Sound is an important dimensional consideration that paces delivery and textures the media's message. The delivery device may be as simple as a television presentation, however it was demonstrated in the students' work that alternative video projection devices could be far more effective.

The translation of Le Corbusier's Purist compositions created static plastic spaces that were fixed in time. Corbusier in his Phillips Pavilion seemed content that the shell would be a container for performances of an electronic poem. However, the work inverts Corbusier's views on Cubism and Purism; it employs the

theory of Cubism to translate abstract graphic narratives into spatial and time aware compositions.

The net result of translating these reconfigured Cubist and Purist derivative compositions to video is that understanding is transferred from a simultaneous act of reading to a sequential act of recognition. While Corbusier's *Guernica* mural is 7.8 x 3.5 meters, its televised video counterpart has a screen with a resolution of only 320 by 200 dots. Funneling the mural's embedded meaning through this constricted filter is a daunting challenge; however, the video media, as demonstrated in television advertising, is a highly efficient communication vehicle. The narrative construction is analogous to composing a graphic/sound exhibit in long tube, where the composition is experienced in sequence as the viewer progresses. The composition within the tube is a separate creative endeavor. It is the memory of the design narrative experienced on this journey that is intended to guide and enlighten the architect using *Revit* and its related class of computer modeling software.

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