



Fluid Architectures and Sampled Spaces: Reflections on a Media/Architecture Performance

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50 WORD SUMMARY

The architecture of the rheomode is a template for a digitally-facilitated linguistic evolution. The "rheomode," a term coined by physicist David Bohm, translates literally into "flowing language." Toward a discovery of 21st century modes of communication and perception, the rheomode communicates the interconnected flux of wholeness rather than fixed, finite, fragmented parts.

ABSTRACT

The architecture of the rheomode is a template for a digitally-facilitated linguistic evolution, discovered through the laboratory of the live theatrical performance of *cosine*.

cosine is an interdisciplinary multimedia performance event that was developed at the Temple New Media Performance Laboratory, in collaboration with New York-based production company Harakti Multimedia. The collaborative work involved principal investigators from the disciplines of digital media, architecture, choreography, electronic music, theatrical design, video, photography, visual art, and live performance. It was inspired by and structurally based on ideas derived from math and modern physics.

The work asked: What happens when architectural structure and kinesthetic communication come into direct relationship with one another? What type of resonating plurality can the senses perceive between simultaneous multiple tracks of visual imagery? What do we hear when confronted with a 24 layer collage of sound spiraling around an environment in 360 degrees? What is the threshold of our sensory perception and what happens when we push that envelope? How is our context for understanding communication and codifying meaning affected by a frame that is neither fixed nor singular, but continuously changing and dynamically recontextualizing itself and its contents? How are our minds, bodies, and senses reconfigured by Einstein's pivotal discovery that the speed of light is the only universal constant, and by a communications technology infrastructure that is exponentially accelerating our cultural language toward this end? If Newtonian physics and corresponding notions of space and time provided the groundwork upon which the prevailing paradigms of the 19th and 20th centuries were constructed, what are the tenets of an Einsteinian paradigm that can give rise to 21st century modes of communication and understanding?

A common ground that unites all of these questions is their relationship to the digital medium and its medium-message implications. *cosine* drew many of the underlying principles of the digital medium out of the box of the computer and explored them in physical space, with physical bodies and a physical structure, in order to provide a substantially more visceral and multi-dimensional opportunity to examine and experience them with our senses.

Manifesting and realizing elements derived from the digital medium in physical space and performative context resulted in something that was, surprisingly, arguably a kind of architecture. When communicative building blocks of the digital medium – composited imagery, layered sound, dynamic structure, hypertext, metaphor, symbolic communication – meet in physical space, the sum of their parts becomes a multi-dimensional structure that can only be appropriately contained and described by an expression of space and dimension as well as communicative form. Language, when truly expanded into multiple media, becomes three dimensional, becomes a temporal-spatial dialogue of signifiers and stimuli in a dynamic, interactive, three-dimensional environment. Structure becomes a transparent vessel for synthesis and a crucible that contains and orchestrates a vast, symphonic collage of individual voices and communicative elements. Form becomes a dialogue between concepts, symbols, and multi-sensory stimuli. The result is a dynamic architecture made of composited language. And at the same moment that language becomes an architecture, architectural expression becomes mobile and fluid, dynamically responding to the fluctuations of language. This liminal synthesis of media and architecture I have termed “the architecture of the rheomode.”

The “rheomode,” a term coined by physicist David Bohm, translates literally into the “flowing mode” or “flowing language”. The rheomode is an experiment in language in which representation is defined in relation to movement rather than stasis, energy rather than matter, the wave rather than the particle. Toward a discovery of “the language of the quantum wave,” the rheomode communicates the interconnected flux of wholeness rather than fixed, finite, fragmented parts.

PAPER

The architecture of the rheomode is a template for a digitally-facilitated linguistic evolution, discovered through the laboratory of the live theatrical performance of *cosine*. *cosine* is an interdisciplinary multimedia performance event that was developed at the Temple New Media Performance Laboratory, in collaboration with New York-based production company Harakti Multimedia. The collaborative work involved principal investigators from the disciplines of digital media, architecture, choreography, electronic music, theatrical design, video, photography, visual art, and live performance. It was inspired by and structurally based on ideas derived from math and modern physics.

As conceptual instigator and director of the work, I facilitated a crucible in which the threads of these various disciplines would interweave, clash, and cooperate toward a common goal. The goal was realized in the form of a performance series at the Temple University New Media Performance Lab, and at HEREArt Mainstage, New York. However, the interdisciplinary collaborative process of *cosine* proved to be at least as substantial as the product, and it is with the intention of articulating and sharing that process that I document this new work. *cosine* was pioneering in its cross-disciplinary communicative scope, and in addition to reflecting on it through the lenses of the various disciplines involved, I believe it is important that we listen carefully to what its messages may tell us about new media interdisciplinary collaboration and the macrocosmic project of evolving our disparate modes of seeing and explaining the world into a symbiotic collaborative framework in which the whole is greater than the sum of its parts.

By definition, *cosine* cannot be documented from one perspective. The work is at its core a mosaic, in which no one voice or element is ever dominant. *cosine* shatters the two-dimensional frame and proscenium vantage point, and frames every element from multiple angles and in relation to every other element. The work is defined by relationship rather than singularity, motion rather than stasis. No one element can be effectively “fixed” in stillness or isolated from any other. It is a depiction of a fluid, complex whole.

This essential shift from a singular statement to plural voices of authorship and multiple vantage points raises new questions about appropriate forms for documentation. The written word is a linear, consecutive, hierarchical medium that meets structural limitation when confronted with the depiction of an interdisciplinary multimedia mosaic. To document a nonlinear expression in linear form is to flatten its dimensionality, and, to refer to modern physics, to collapse the dynamic potential of the wave into the definitive experience of the particle.

Reflecting on *cosine*, it was ultimately more an exploding question of potential than a depiction of any finite or definitive statement. The work asked: What happens when architectural structure and kinesthetic communication come into direct relationship with one another? What type of resonating plurality can the senses perceive between simultaneous multiple tracks of visual imagery? What do we hear when confronted with a 24-layer collage of sound spiraling around an environment in 360 degrees? What is the threshold of our sensory perception and what happens when we push that envelope? How is our context for understanding communication and codifying meaning affected by a frame that is neither fixed nor singular, but continuously changing and dynamically recontextualizing itself and its contents? How are our minds, bodies, and senses reconfigured by Einstein’s pivotal discovery that the speed of light is the only universal constant, and by a communications technology infrastructure that is exponentially accelerating our cultural language toward this end? If Newtonian physics and corresponding notions of space and time provided the groundwork upon which the prevailing paradigms of the 19th and 20th centuries were constructed, what are the tenets of an Einsteinian paradigm that can give rise to 21st century modes of communication and understanding?

A common ground that unites all of these questions is their relationship to the digital medium and its medium-message implications.

Leonard Shlain, in his book, Art & Physics: Parallel Visions in Space Time and Light (1991), states, “Art can be understood as the preverbal stage of a civilization first contending with a major change in its perception of the world.”¹

Marshall McLuhan asks in Understanding Media (1964), “If men were able to be convinced that art is precise advance knowledge of how to cope with the psychic and social consequences of the next technology, would they all become artists? Or would they begin a careful translation of new art forms into social navigation charts? I am curious to know what would happen if art were suddenly seen for what it is, namely exact information of how to rearrange one’s psyche in order to anticipate the next blow from our own extended faculties...”²

cosine drew many of the underlying principles of the digital medium out of the box of the computer and explored them in physical space, with physical bodies and a physical structure, in order to provide a substantially more visceral and multi-dimensional opportunity to examine and experience them with our senses. For example, an audio editing program vertically stacks anywhere between two and 50 layers of sound on a screen as a user creates a multi-layered, or “vertical” sound composition. Led by composer Todd Shilhanek, *cosine* brought those multiple layers into space and “embodied” them as a vertical assemblage of audio signals literally traveling in three dimensions through the environment.

Similarly, information architectures and virtual architectures in digital space are often referred to as liquid, interactive, ethereal. What does that mean in terms of form, structure and boundary? The physical structure that contained and defined *cosine* was not a fixed object, but a dynamic collection of faces and video projection surfaces that was both manipulated by its performing inhabitants and framed from multiple perspectives by the audience that surrounded it. It was, in this way, a physical manifestation of virtual architecture.

Visual compositing – the ability to merge and layer one image with another – is a fundamental visual tool of the digital medium. *cosine*’s imagery included two different multi-layered video tracks projected onto the media/architecture structure from four hanging video projectors suspended on the periphery of the environment. The imagery intersected the structure, the walls, the performers, the audience and the opposing video track in different ways at different times. This shifting assemblage of layered imagery created an experience comparable to jumping inside of a visual digital image composite as it is being created, and experiencing it with your whole body and all of your senses.

It is common knowledge that digital media is computationally driven. Complex, ethereal imagery, interactive functionality, and orchestration of multiple elements are the product of computer programming, driven by algorithms and mathematical functions. *cosine* was generated and unified by the Lucas sequence, a series of numbers that mathematically explains a spiral. These numbers affected everything from the tones of the music to the proportions of the architectural structure, to the theatrical staging, to the overall rhythm of the piece.

Manifesting and realizing these various elements derived from the digital medium in physical space and performative context resulted in something that was, surprisingly, arguably a kind of architecture. When the communicative building blocks of the digital medium – composited imagery, layered sound, dynamic structure, hypertext, metaphor, symbolic communication – meet in physical space, the sum of their parts becomes a multi-dimensional structure that can only be appropriately contained and described by an expression of space and dimension as well as communicative form. Language, when truly expanded into multiple media, becomes three dimensional, becomes a temporal-spatial dialogue of signifiers and stimuli in a dynamic, interactive, three-dimensional environment. Structure becomes a transparent vessel for synthesis and a crucible that contains and orchestrates a vast, symphonic collage

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The “rheomode,” a term coined by physicist David Bohm, translates literally into the “flowing mode” or “flowing language.” The rheomode is an experiment in language in which representation is defined in relation to movement rather than stasis, energy rather than matter, the wave rather than the particle. Toward a discovery of “the language of the quantum wave,” the rheomode communicates the interconnected flux of wholeness rather than fixed, finite, fragmented parts.

David Bohm states in his book Wholeness and the Implicate Order (1980) that modern physics cannot be fully understood or assimilated by our culture until its discoveries are reflected in language, expression and communication.³ Beginning with the most fundamental breakthrough, the discovery that the particle and the wave are interchangeable, $E=mc^2$, and recognizing that we are conditioned to perceive the world according to the laws and language of the particle, *cosine* asked: what is the language of the wave? On a formal level, it approached that question through an exploration of the rheomode, and on a content level, it explored the transformative process required to restructure one’s perception toward this end.

My goal for the *cosine* collaboration was to investigate the architecture of the rheomode, or the constructs of form and language that enable communication through motion, fusion, fluidity and holistic perception. The investigation was to occur in the spaces between the multiple contributing disciplines, and through the lens of the digital medium. It is my belief that digital medium -- based on light, traveling electricity, abstract computational structures, fusion of media, and dynamic interactivity-- introduces an essentially 21st century paradigm, and the architecture of rheomode is a structural framework that may lay a foundation for codifying this mode of perception.

cosine was an initial articulation of the architecture of the rheomode. Beyond that, it seems impossible and inappropriate to definitively decide or state what it was, or to draw it to conclusion by collapsing its waves of wide open questions into particle-bound answers. Therefore, I will attempt to deconstruct its rheomode architecture, and describe its process of becoming, which is, perhaps, its essence, its alpha and omega, its initial and final statement.

cosine began as an original abstract narrative text and accompanying series of 50 ink paintings. The text and paintings created a poetic structure, which became the foundation for exploration and manifestation through sound, choreography, staging, architecture, video, and production design. The video imagery, three-dimensional sound environment, choreography, and architectural structure were all being manifest at the same time – no one element had dominance or served as the foundation upon which the others would be constructed. The poetic structure was simultaneously realized as a distinct through line in each of these disciplines, and as an orchestration into a vast, symbiotic whole.

Experientially, as agent of orchestration for this multi-faceted work, I was often thrilled and sometimes horrified by the lack of control and essential “chaos factor” the process afforded. Indeed, *cosine*’s rheomode architecture was ultimately a product of chaos. It seemed to circumvent every conventional structure that was imposed upon it, and evade every form that tried to contain it. It was created more from dynamic, subconscious bursts than from the methodical outline designed to guide it. It was continuously late. Trying to interface with the languages of foreign disciplines continuously baffled contributors, and ego battles ran rampant even among the mature and well-intentioned. More often than not, conflict gave rise to progress, as opposing viewpoints would clash to create new developments almost in spite of themselves. The results were continuously surprising. It was, in a word, kaleidoscopic, a dazzling display of complexity in motion... impossible to contain or “catch” all at once, constantly

changing and providing a new lens through which to reinvent and re-frame itself. It employed a language that was emerging as we were creating it, and it challenged all of us to re-align our intentions through a sensitivity to the whole that transcended the individual parts.

The whole of *cosine* is unified by its metaphors. These metaphors serve as the underpinnings of its rheomode architecture. *cosine*'s initial metaphor is that of *reflection*. The journey begins with an invitation, an interaction, through a collection of visual symbols and the structural idea of a mirror. The series of 50 ink paintings, symbolic and somewhat iconographic in nature, are displayed in the playing space in direct spatial opposition to the entering audience, inviting them to immediately break the fourth wall, and setting up a mirror-like relationship between the audience and the images. Ideas of asymmetrical mirroring and reflection are carried throughout the entire piece.

The second metaphor is the relationship between the *conscious, subconscious and subliminal mind*. The 3 "zones" of the conscious, subconscious and subliminal defined the physical playing space and the architectural structure. These different realms are the "characters" in *cosine*. They are manifest through the physical performers, the two tracks of video (which reflect the subconscious and subliminal experience), and the flowing vacillations of the sound collage – which depicts a direct dialogue between the three realms that underscores the theatrical dialogue that drives the piece.

The third metaphor is the *spiral*. The underlying scaffolding – or computational engine – of *cosine* is the Lucas sequence, a series of numbers that mathematically explains a spiral. Poetically integrating history and progress, each new number in the series is generated by the sum of the two numbers that precede it. 1,3,4,7,11,18,29... The Lucas sequence is prevalent throughout *cosine*, as is the number seven. The structure is three sided with four points of video projection illuminating the environment in conjunction with four channels of sound creating a 3D sound environment. The piece is 29 minutes in length. It has seven scenes, each of which is exactly three, four, or seven minutes in length. The shift from one scene to the next occurs at the exact minute marks of the numbers in the series. In addition, the climax of the piece is at the golden mean (18). At this point, the vertical principle awakens, and that which has occurred previously accumulates into simultaneity. In the original music for *cosine*, the Lucas sequence is omnipresent. Composer Todd Shilhanek used the numbers of the sequence as pitch levels, and as the means by which new rhythmic patterns are introduced. It also plays a prominent role in the architectural environment, generating many of the lengths, proportions, and structural parameters.

The spiral leads to *cosine*'s fourth metaphor: a *cosine wave*. As the peak of a cosine wave is "time zero," *cosine* explores an accumulation of sensory information leading to an experience of "simultaneity" akin to Einstein's description of perception at the speed of light. The numbers of the Lucas sequence and the path of the spiral drive this accumulation. In the final minute of the piece, every sound heard for the last 28 minutes is playing, and every video image seen for the last 28 minutes flashes into view for a fraction of a second.

Finally, *cosine* is essentially about perceptual transformation and it utilizes the concluding metaphor of a *butterfly*. The architectural structure, which was pivotal in unifying *cosine*'s metaphors, was initially conceived of as a series of faces and "walls" that initially appear to be a labyrinth, or series of obstructions separating the conscious, subconscious and subliminal realms. As the piece progresses through the spiral and into the accumulation, the walls shift, tilt and lift off the ground, the realms of the conscious, subconscious and subliminal come into alignment with one another, the wave awakens through the particle, and the whole of the structure reveals itself to be a butterfly.

In conclusion, I have had very few conclusions about *cosine*, and I continue to have as many questions as answers. I do believe that in its essence, this work was about transformation and a process of becoming. It was, and continues to be, essentially a verb.

So, to document the final stages of its manifest process, *cosine* changed dramatically from its opening at Temple to its closing in New York. It had 12 performances in total, and each of them was entirely distinct and substantially different from the others. The overall progression that the work underwent can be compared to a kind of alchemical cooking. When it opened at Temple, we had assembled a lot of unfamiliar ingredients that did not necessarily have prior knowledge of how to blend with one another. As the work progressed, the hard edges began to blur... the architecture became part of the dance, the imagery fell into sync with the characters' experiences, the sound came into a sort of resonant harmony with the environment, the colors in the paintings on the periphery of the space bled through into the bodies of the performers and the body of the architecture... Each time such a progression occurred, it felt like shedding a skin, or breaking through a kind of barrier that was encasing each element in a smaller, more guarded, more confined framework. As the elements merged, it felt – from the inside of the piece – like unleashing potential.

Witnessing this progression from the perspectives of both director and performer, I realized that the performative element was the catalyst in allowing the architecture of the rheomode to blossom into a free-flowing dance of synthesized forms and rhythms. The performers became the window through which the audience could feel and enter the vision of *cosine*. In the initial performances, there was dramatic variation in audience response, which coincided with a palpable and consensual feeling of when it worked and when it did not. Because many of the ideas and sensory impressions depicted in the work were new and unfamiliar to the audience, the vehicle of empathetic participation with the performers' experience within *cosine* was essential. Moreover, it was through the performers' experience that the synthesized whole of the work was revealed.

A performer's capacity for feeling, perception and experience is what they are able to offer to an audience in the form of empathetic communication. Although this essential performative function can be somewhat elusive in terms of concrete description, it is fundamental to a theatrical act and creates a resonance with the audience when successfully realized. It is the director's task to cultivate this resonance, witnessing and sculpting its development. *cosine's* progression toward resonance was a direct function of the evolution of the performers' perceptual experience and empathetic communication.

When the performers could truly see and feel and understand and embody how all of these pieces came together to create a unified kaleidoscopic picture, they opened a door for the audience and for each other, and the whole thing crystallized as this magnificent, multi-faceted structure. Conversely, when the performers – or even some of the performers – were too tightly focused on only their own tasks and concerns, or, for whatever reason did not have their perceptive shutters fully opened, the door to the heart of the work remained closed or only partially opened, and the various interdisciplinary elements remained distinct and separate, and, even if precisely aligned, did not achieve their alchemy.

What an interesting challenge for a performer, which parallels an interesting challenge for all of us. A performer is generally somewhat naturally inclined and conditioned to hone his/her force and talent into a tightly focused beam with an intent toward a singular excellence. I believe this is a natural and heightened function of the human ego. However, in order to succeed in the context of *cosine*, the performers had to circumvent their conditioned tendencies and work with unfamiliar elements and with the whole picture. When this happened, it was extraordinary. When the performers were able to soften the edges of their individual focus and open their awareness to the whole, they each became illuminated by a kind of synthesized alchemical gold that was far more rich and fascinating than the sum of its parts. By generously expanding their own boundaries and making the boundaries of their perception soft and semi-transparent, by opening their inner windows and looking outward, they awakened the larger vision and the whole picture came to life and began to shine through them.

The analogy of the performer's role and experience in relation to the challenge confronting any one of us is simply to say that the whole picture is there if we allow ourselves to see it – and whether or not we allow ourselves to see it makes all the difference in terms of whether or not the disparate threads woven together synthesize into a resonant whole. The performer's experience is also relevant in that a performer works not only with intellect and historical foundation, but also with body and with emotion. A vision of the whole is not something that can be merely intellectually conceived; it must be felt in order to be brought to fruition. In this way, it takes a whole human being to participate with a vision of a whole picture. This takes not just intelligence, but courage, intuition, and heart.

The project of synthesis is undeniable – it is implicit in the paradigms presented by the digital medium, by modern science, and by the questions that face the 21st century. It is my hope that *cosine*, its rheomode architecture and its alchemical process, can contribute to the scaffolding that will support such future efforts.

NOTES

1. Shlain, Leonard. (1991). Art & Physics: Parallel Visions in Space, Time & Light. New York: William Morrow. p. 18.
2. McLuhan, Marshall. (1964). Understanding Media: The Extensions of Man. New York: New American Library. p 71.
3. Bohm, David. (1980) Wholeness and the Implicate Order. London and New York: Routledge. pp 27-47.

BIBLIOGRAPHY

- Bodanis, D. 2000. E=mc²: A Biography of the World's Most Famous Equation. New York: Berkley Books.
- Bohm, D. 1980. Wholeness and the Implicate Order. London and New York: Routledge.
- De Kerckhove, D. 2001. The Architecture of Intelligence. Basel, Boston, Berlin: Birkhauser.
- Gardner, H. 1983. Frames of Mind: The Theory of Multiple Intelligences. New York: HarperCollins.
- Holtzman, S. 1994. Digital Mantras: The Languages of Abstract and Virtual Worlds. Cambridge, Mass. and London: MIT Press.
- Manovich, L. 2001. The Language of New Media. Cambridge, Mass. and London: MIT Press.
- McLuhan, M. 1964. Understanding Media: The Extensions of Man. New York: New American Library.
- Rush, M. 1999. New Media in Late 20th-Century Art. New York and London: Thames & Hudson.
- Schechner, R. 1973, 1994. Environmental Theater. New York: Applause Books.
- Shlain, L. 1991. Art & Physics: Parallel Visions in Space, Time & Light. New York: William Morrow.
- Waldrop, M. M. 1992. Complexity: The Emerging Science at the Edge of Order and Chaos. New York: Touchstone.