International Online Journal of Education and Teaching (IOJET), Vol. 12 , No. 4, 2025 (pp. 100-130)

RESEARCH ARTICLE WWW:IoJet.org

From Surface to Volume: Translating Abstract Art into Spatial Design Education

Sevinç Kurt[1]*, Nezih Ayiran[2]

[1]Cyprus International University, Nicosia, North Cyprus

[2]Professor, Dr. Nezih Ayıran Cyprus International University, Nicosia, North Cyprus

Keywords:

Abstract art,
Spatial perception,
Experiential learning,
Design education,
Kinaesthetic learning,
Interdisciplinary pedagogy,
Extracurricular activities

Author's Email :
skurt@ciu.edu.tr,
nezihayiran@hotmail.com

Author's Orcid :
0000-0002-7446-9229,
0000-0001-7707-9552

Received : 22.10.2025
Revised : 12.11.2025
Accepted : 14.12.2025

Abstract

This study investigates the pedagogical and creative potential of integrating abstract art into design education through the "From Surface to Volume" workshop, which was conceived not merely as an instructional activity but as a research process. The workshop aimed to examine how the translation of abstract paintings from two-dimensional surfaces into three-dimensional spatial models affects students' creativity, spatial perception, and interdisciplinary thinking skills. A qualitative research design was employed, combining the analysis of student-produced models and posters with semi-structured interviews. The artifacts were evaluated according to composition, form, material, color, texture, and spatial perception, while thematic analysis of the interviews provided insight into students' experiences and learning outcomes.

Findings indicate that students successfully translated key design principles—such as form, balance, and depth—into three-dimensional compositions, developing stronger spatial awareness and establishing a creative dialogue between historical and contemporary contexts. The process enhanced problem-solving abilities, kinaesthetic learning, and intrinsic motivation, transforming learning from a grade-oriented task into an exploratory and engaging experience. Overall, the study highlights the importance of extracurricular, experience-based activities as transformative tools in architectural and design education, offering a model for fostering creativity, conceptual thinking, and interdisciplinary connections.

How to cite this article: Kurt S, Ayıran N (2025). From Surface to Volume: Translating Abstract Art into Spatial Design Education. International Online Journal of Education and Teaching, Vol. 12, No. 4, 2025, 100-130

Introduction

Abstract painting, emerging in the early twentieth century, represented a radical shift from traditional artistic conventions by emphasizing visual elements—form, color, line, and texture—over realistic representation. It aimed to express the artist's inner world and evoke emotional and intellectual responses rather than depict external reality. As defined by the Tate Gallery, abstract art "does not attempt to represent an accurate depiction of a visual reality but instead uses

shapes, colours, forms and gestural marks to achieve its effect," underscoring its focus on perception and creative interpretation. Another commonly used term for abstract art is non-figurative art. Unlike figurative painting, abstract painting does not aim to tell a direct story or depict a tangible object. Instead, it offers artists a free and open field to express their inner experiences and universal concepts. This freedom allows viewers to interpret the artwork through their own experiences and perceptions, creating a dynamic interaction between art and audience. The primary purpose of abstraction in art is to construct a visual composition that reflects the artist's subjective imaginative world through form, color, and line—stimulating the viewer's imagination and evoking an abstract, emotional experience that varies according to individual personality and psychology.

The characteristics of abstract painting have not only expanded the boundaries of art but also exerted a profound and lasting influence on disciplines such as architecture, design, and education. In particular, the modern art movements that emerged in the early twentieth century—such as De Stijl, Suprematism, and Constructivism—blurred the boundaries between painting and architecture, initiating a new dialogue between the two disciplines. Through geometric forms, color theories, and spatial compositions, these movements introduced innovative approaches to exploring how art could be integrated into architectural design processes.

In this context, according to the interpretation expressed by Van der Leck in March 1918 (and similarly emphasized during the same period by Van Doesburg, Mondrian, and Oud)

> "Modern painting has now arrived at the point at which it may enter into a collaboration with architecture. It has reached this point because its means of expression have been purified. The description of time and space by means of perspective has been abandoned: now it is the flat surface itself that transmits spatial continuity. Painting today is architectural because in itself and by its own means it serves the same concept as architecture—space and the plane—and thus expresses the same thing but in a different way." (Bois, 1990, p. 111)

According to this approach, the art of geometric abstraction, by externalizing pictorial emotion, has generated new forms and relationships between forms, and this art is envisioned to evolve into a new architecture. This transformation will extend these forms from the surface of the canvas into spatial experience. Kandinsky, in 1938, noted that in abstract painting the artist was no longer confined to the canvas (the pictorial plane) but could project compositions into space (Chipp, 1968, p. 346). In this context, the translation of abstract art from two-dimensional surfaces to three-dimensional spatial experiences holds significant potential not only as an artistic practice but also as an educational tool. The emerging interaction between painting and space transforms both architectural design processes and pedagogical approaches, fostering an interdisciplinary perspective.

The *From Surface to Volume* workshop was organized to explore this potential and examine the impact of abstract art on design education. It provided students with the opportunity to engage deeply in abstract artworks and reinterpret them as three-dimensional forms. The workshop offered an experiential learning environment (Kolb, 2015) that fostered both creativity and spatial perception.

Throughout the process, the fundamental principles of modern art movements and the interrelations between art and architecture were emphasized, encouraging students to develop a deeper understanding of these historical and conceptual connections. Furthermore, the study examined how methods such as kinesthetic learning and physical modeling transformed students' approaches to design processes. A total of forty-nine paintings by various artists associated primarily with the *De Stijl*, Russian Constructivist, and Suprematist movements were introduced at the outset of the workshop.

Students, working in groups of up to three, were asked to select one of the introduced abstract artworks, investigate its stylistic and architectural correlations, produce a three-dimensional interpretation, and design a corresponding poster. Among the selected works were five by *El Lissitzky*, four by *Mondrian*, two by *Kandinsky*, and one each by *Picasso*, *Van Doesburg*, *Vasarely*, and *Parker*.

Additionally, one painting by *Malevich* was chosen by two different groups for distinct interpretations. In total, forty-four students participated, forming seventeen project groups.

Prior to the design phase, participants were informed and trained on key movements of modern abstract art to strengthen their theoretical understanding of abstraction. The projects were then developed individually or in small groups of up to three participants, with some students working alone and one student contributing to both individual and collaborative work.

Aims and Objectives of the Study

In line with the purposes of abstract art discussed above, the primary aim of the *From Surface to Volume* workshop was to enhance students' imagination through active participation and to provide them with an abstract and emotional artistic experience.

Other objectives of the workshop included fostering a deeper understanding of the stylistic and historical relationships between art and architecture by encouraging participants to reinterpret the abstract paintings of prominent modern artists in three dimensions. The workshop also sought to raise students' awareness—through enjoyable and creative processes—of the significance and necessity of three-dimensional thinking in design, as implied by the workshop's title, and to contribute to the development of their spatial reasoning skills. As Smith (cited in Özdamar, 2024, p. 17) emphasizes, "Three-dimensional thinking, observation, and application have long been essential requirements of architectural education. Architectural models that stimulate and express three-dimensional perception have remained indispensable components of the design process since the Renaissance."

The process of model-making involves not only the sense of sight but also touch, offering students a *kinesthetic* learning experience. While Aristotle regarded touch as one of the five fundamental senses, it has often been undervalued; yet Özdamar (2024) highlights its pedagogical importance in architectural education. According to Çelik-Alexander (as cited in Özdamar, 2024), kinesthetic perception and empathy heighten awareness of the interactions between body, mind, and environment, facilitating the comprehension of relationships between phenomena and contexts.

Considering Çelik-Alexander's perspective, the process of transforming two-dimensional abstract paintings into three-dimensional interpretations was expected to enhance participants' kinesthetic perception and empathy, enabling them to establish a deeper cognitive and bodily connection with art. Through this engagement, students could better grasp the interaction between art and architecture, thereby fulfilling the workshop's intended objectives to a significant extent. Similarly, Miller and College (n.d.) argue that sculpture strengthens the connection between the perceiving self and the perceived world. Within this framework, participants were anticipated to gain a deeper understanding of both the abstract paintings they reinterpreted and the aesthetic outlook of their respective periods—an experience likely to broaden their design perspectives and foster the development of their creative design skills.

This paper examines the findings of the *From Surface to Volume* workshop—conducted as an extracurricular academic activity—to explore how abstract art can be utilized in design education to cultivate students' creative and spatial abilities. It also investigates the potential of the interdisciplinary relationship between painting and architecture to serve as a model for future pedagogical practices in design education.

Accordingly, the study focuses on the following research questions:

1. How does the three-dimensional reinterpretation of abstract paintings influence students' creativity and spatial perception?
2. Can historical and conceptual links between painting and architecture be more deeply understood through such an activity?
3. How do kinesthetic learning and physical modeling transform students' approaches to design processes?

The study employed a qualitative research design, beginning with the identification of a broad selection of abstract paintings to be included in the workshop. Data was collected and interpreted through qualitative analysis methods.

Two- and Three-Dimensional Modes of Expression in Painting: Theoretical Framework and Application

Two-dimensional painting aims to construct a planar composition on the surface and has formed a foundation of art history from antiquity to modernity. Especially prior to the Renaissance, paintings largely adopted symbolic and planar modes of representation; Byzantine icons and medieval miniatures are exemplary in this regard.

The core constituents of two-dimensional art—color, line, texture, and composition—enable artists to organize the surface and offer viewers a coherent visual experience. Color carries emotional and symbolic meanings; line delineates forms and structures the composition; texture accentuates visual and tactile qualities; and composition brings these elements into a harmonious whole.

With the discovery of perspective during the Renaissance, three-dimensional expression revolutionized painting. Linear and atmospheric perspective, alongside chiaroscuro, allowed artists to create the illusion of depth and space on a flat surface. Masterworks such as Leonardo da Vinci's *The Last Supper* and Raphael's *The School of Athens* exemplify the sophisticated use of perspective. Three-dimensional modes of visual expression employ various techniques to generate the perception of depth and spatiality. Linear perspective constructs an illusion of depth through the convergence of orthogonal lines at a single vanishing point on the horizon, creating a coherent spatial system. Atmospheric (aerial) perspective conveys distance by modulating color intensity, tonal value, and contrast—objects farther away appear lighter, less saturated, and lower in contrast. Chiaroscuro or shading accentuates volumetric form through the interplay of light and shadow, rendering surfaces with tactile and spatial presence.

Together, these methods enable artists to evoke a convincing sense of space and depth on a flat surface, transforming two-dimensional representation into a perceptually three-dimensional visual experience. As Panofsky (1997, p. 41) argues, perspective embodies the insight that visual representation is not merely imitative but constructive; it rationalizes space, freeing it from dependence on material objects.

Within the *From Surface to Volume* workshop, the three-dimensional reinterpretation of an artist's abstract painting yields inherently hybrid outcomes—artifacts that register both the original painter's and the interpreter's imaginative perspectives. As Girgin (2020) indicates, until the twentieth century painting often served as a source of inspiration for sculpture; thereafter, sculpture increasingly informed painting, generating a creative dialogue between past and present. In line with this, the workshop anticipated that reimagining century-old abstract paintings in three dimensions would enhance participants' creativity. Özdamar (2024) suggests that such interpretive works arouse a desire for discovery in viewers; since abstract art already invites inquiry more strongly than figurative art, its three-dimensional reinterpretation likely intensifies this exploratory impulse. The positive responses recorded after the workshop exhibition support this inference.

Two- and Three-Dimensional Modes of Expression in Abstract Art

The early twentieth century witnessed a radical reinterpretation of two- and three-dimensional modes of artistic expression through the emergence of abstract painting. Abstract artists moved away from representational realism, engaging instead with fundamental visual elements—form, color, and line—as autonomous carriers of meaning. In Mondrian‟s view, human misery and social injustice were the result of inequality, not only socio-economic but also psychological (Veen, 2017, 1). The geometric abstraction of Piet Mondrian and the lyrical abstraction of Wassily Kandinsky exemplify two distinct yet complementary directions within this movement.

In abstract art, three-dimensional expression finds resonance particularly in sculpture and installation art. For instance, Kazimir Malevich's Suprematist sculptures exemplify the translation of painterly abstraction into spatial form, thereby extending the boundaries of art and enriching the viewer's spatial and emotional experience.

Kandinsky articulated the philosophical foundation of abstraction in *Concerning the Spiritual in Art* (1912), where he stated that *"Abstract painting reflects the artist's inner world and thus invites the viewer on an intellectual journey"* (Kandinsky, 1977, p. 112). A mystic by inclination, Kandinsky longed for a renewal of the world through an art that embodied "pure spirituality." In his impassioned yet intricate text, he emphasized the psychological effects of color, noting how a vivid red could strike the viewer *"like the sound of a trumpet."* He believed that color could forge a spiritual unity among people and thus began experimenting with the *"music of color"*—experiments that inaugurated what later came to be known as Abstract Art. Although the term "abstract" has often been critiqued as misleading, with alternatives such as *non-objective* (Malevich, 1959 or *non-figurative* being suggested, Gombrich (1992, p. 519) reminds us that *"many terms in art history have arisen more by accident than by scholarly design."*

According to Read (1956), painting seeks to evoke a three-dimensional illusion on a two-dimensional surface, while sculpture aims to create a tangible three-dimensional form within space. Similarly, Vance (1995) argues that sculpture, as a designed three-dimensional object, fundamentally concerns the occupation of space. As Martin (1981, p. 291) observes, *"Painting reflects the world not from within it but from without, whereas sculpture is the artistic manifestation of beings within the world."* While this distinction may hold for figurative art, it is less applicable to abstraction, where the artist's inner world rather than the external world becomes the locus of creation.

In the *From Surface to Volume* workshop, the reinterpretation of an abstract painting into a three-dimensional model inevitably produces a hybrid expression—one that reflects both the original artist's inner vision and the interpreter's personal sensibility and worldview. Girgin (2020) notes that whereas in earlier periods painting often inspired sculpture, in the twentieth century the reverse increasingly occurred, generating a creative dialogue across time.

The workshop embraced this potential for dialogue by inviting participants to reimagine abstract paintings—many of them created nearly a century ago—in three-dimensional form. This act of reinterpretation across temporal distance was anticipated to enhance participants' creative thinking. As Özdamar (2024) argues, such interpretative works stimulate the viewer's desire for discovery; abstract painting, more than figurative art, already evokes a sense of exploration, and its three-dimensional translation intensifies this effect. The enthusiastic responses of visitors to the subsequent exhibition may thus be regarded as an indicator of this heightened exploratory engagement stimulated by the students' works.

From Painting to Three-Dimensional Works: Examples of Inspiration in Art and Architecture

The De Stijl movement of the early twentieth century blurred the boundaries between art and architecture, fostering a creative dialogue between the two disciplines. Advocating universality, order, and harmony, De Stijl artists and architects sought to translate visual abstraction into spatial composition. Among its pioneers, Piet Mondrian's geometric abstractions and Theo van Doesburg's spatial compositions profoundly influenced not only the field of painting but also architectural and design practices. De Stijl was international in its outlook: in contact with the Bauhaus and the Russian Constructivists, it helped create the ideology and formal language of modernism (Overy, 1991, 11).

Van Doesburg's *Composition: Space and Time II* (1924) (Figure 4.36) exemplifies this synthesis. Using intersecting planes, primary colors, and rectilinear organization, the work conveys notions of space and temporality in a purely abstract language. It serves as a visual exploration of rhythm and structure, inspiring subsequent generations of designers to reinterpret the two-dimensional principles of painting within three-dimensional architectural form.

Rietveld's Schröder House: The De Stijl Impact on Architecture

Gerrit Rietveld's Schröder House (Figure 2.1) stands as one of the most iconic architectural manifestations of the De Stijl movement. The house translates Mondrian's pictorial language—characterized by vertical and horizontal lines, primary colors (red,

Fig. 2.1: Rietveld's Schröder House: A Three-Dimensional Interpretation of Van Doesburg's *Composition: Space and Time II* (1924) and Mondrian's Paintings

Source: Retrieved June 9, 2024, from https://www.iconichouses.org/news/iconic-houses-in-the-netherlands-rietveld-schroder.

blue, yellow), and asymmetrical balance—into built form. The composition's spatial layering and open-plan configuration embody De Stijl's pursuit of universal harmony through abstraction.

Far beyond a domestic residence, the Schröder House functions as a tangible synthesis of art and architecture. It represents the De Stijl ideal of achieving unity between aesthetic theory and practical design, between pictorial order and spatial experience. In this sense, the building acts as both a conceptual bridge and a didactic model—illustrating how abstract visual principles can govern three-dimensional space.

In the context of the From Surface to Volume workshop, the Schröder House provided a key reference point. Its articulation of planar relationships, color-field composition, and spatial fluidity offered participants a tangible precedent for translating two-dimensional abstract artworks into volumetric architectural interpretations. Through this framework, students could grasp how the visual logic of painting may evolve into spatial reasoning within architecture and design education.

Three-Dimensional Reinterpretations of Mondrian's Paintings

Piet Mondrian's works have inspired three-dimensional reinterpretations not only in architecture but also in design and education. For example, jigsaw-like Lego constructions derived from Mondrian's geometric compositions (Figure 2.2) are used to cultivate children's spatial perception and creative thinking. These designs parallel the goals of the *From Surface to Volume* workshop, where participants explored three-dimensional interpretations of Mondrian's

Fig. 2.2: A Mondrian-inspired puzzle: Lego design for children.

Source: Retrieved June 9, 2024, from https://www.pinterest.de/pin/99571841758125303/.

paintings as a means of translating abstract art into physical form and exercising creative agency.

Examples of Three-Dimensional Works Inspired by Painting

Beyond the few examples mentioned, an extensive literature review conducted for this article found no studies directly aligned with the three-dimensional reinterpretation of an abstract painting and, by extension, with the specific methodology of the *From Surface to Volume* workshop. Nevertheless, there is a body of work on figurative paintings reimagined in three-dimensional form. Girgin (2020) documents examples by artists such as Ann Hirsch, Anthony Caro, Seward Johnson, Juan Muñoz, Rebecca Szeto, Julie Rrap, Yinka Shonibare, and Robert Arneson, whose sculptures adopt canonical figurative paintings as points of departure.

Among these, Anthony Caro's series *Duccio Variations* (1999–2000) deserves special mention. Based on Duccio di Buoninsegna's *Annunciation* (Figure 2.3)—a work that illuminates how space and figures were organized in pre-Renaissance Italian painting and can serve as an entry point for understanding fundamental principles of spatiality in abstraction—Caro created seven sculptures (Figure 2.4). As Caro notes, "When I started, I decided to focus on the architecture in the painting" (Girgin, 2020, p. 521), and "What I saw in it at first glance was an image that interested me architecturally" (Girgin, 2020, p. 520), indicating his sustained interest in the architectural depictions of fourteenth- and fifteenth-century Italian painting.

Caro abstracts Duccio's compositional logic and figure-space relationships, translating them into three-dimensional forms. Although derived from figurative and religious content, Caro's works are rendered in a thoroughly abstract idiom; the "variations" contain no living figures and instead present a semi-abstract architectural reading. While this shares affinities with the workshop's objectives, it does not fully overlap in method and outcome, since Caro reinterprets a figurative painting rather than an originally abstract one. His sculptures activate

Fig. 2.3: Duccio di Buoninsegna, *Annunciation*, 1311.
Source: Retrieved June 3, 2024, from https://www.meisterdrucke.us/fine-art-prints/Duccio-di-Buoninsegna/710204/Panel-from-the-Maest%C3%A0-Altarpiece%3A-The-Annunciation%2C-1311.html.

Fig. 2.4: Anthony Caro, the third of seven sculptures from Duccio Variations (1999–2000).
Source: Retrieved June 3, 2024, from https://www.nationalgallery.org.uk/about-us/press-and-media/press-releases/art-in-dialogue-duccio-caro.

space—treating voids and solids in tandem—thus reframing space not as background but as an integral component of the artwork. This supports the broader claim that art history can be reinterpreted through creative processes, aligning with the workshop's premise that students can strengthen spatial perception and develop creative processes through three-dimensional translations.

Within Girgin's (2020) corpus of painting-based sculptures are Ann Hirsch's 2010 *Untitled* (after Velázquez's 1656 *Las Meninas*), Seward Johnson's sculpture from the "Beyond the Frame" series (after Édouard Manet's 1863 *Olympia*), and Juan Muñoz's 1997 *With the Cord in the Mouth* (after Edgar Degas's 1879 *Miss La La at the Cirque Fernando*) (Figures 5-6). Unlike Caro's semi-abstract approach, these reinterpretations sustain the living figure in sculptural form.

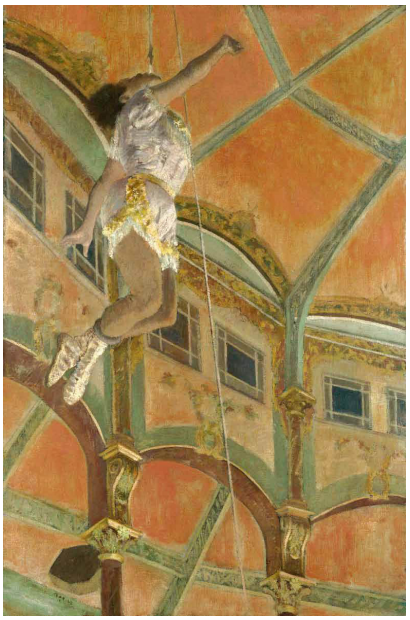

Fig. 2.5: Edgar Degas, Miss La La at the Cirque Fernando, 1879.

Source: Retrieved June 6, 2024, from https://kuadros.com/tr/products/sirk-fernandoda-mademoiselle-la-la.

Although the works of Hirsch, Johnson, and Muñoz differ substantially from the three-dimensional interpretations produced in the workshop, they are included here to clarify distinctions in process, intent, and outcomes, and to underscore that the workshop's outputs belong to a comparatively limited set of analogous practices in the field.

Fig. 2.6. Juan Muñoz, With the Cord in the Mouth (1997), after Degas's Miss La La at the Cirque Fernando (1879).

Source: Retrieved June 6, 2024, from https://www.centrobotin.org/en/obra/la-cuerda-la-boca/.

Throughout his career, Picasso repeatedly engaged the motif of the guitar, exploring varying degrees of abstraction: from the figurative *The Old Guitarist* (1903) to the semi-abstract *Guitar (I Love Eva)* (1912) (Figure 2.7) and *Mandolin and Guitar* (1924). Alongside the painting *Guitar (I Love Eva)*, Picasso produced the semi-abstract Maquette for Guitar (1912) (Figure 2.8) using cardboard, paper, string, wire, and glue, and later a more abstract three-dimensional Guitar (1924) fashioned from painted sheet metal, tin, and wire (Figure 2.9).

Despite its fragile, unconventional materials (cardboard, string, wire), Picasso's 1912 maquette is widely regarded as a foundational work of twentieth-century modern sculpture (Poggi, 2012). Departing from the Western tradition's continuous solid surfaces, it constructs space architectonically through assembled planar elements; negative or "open" spaces assume positive, functional roles—analogous to the guitar's cavity producing sound (Poggi, 2012). Accordingly, *Maquette for Guitar* is considered a pivotal work marking the transition from Analytic to Synthetic Cubism (*The Birth of Synthetic Cubism: Picasso's Guitars*, 2011), highlighting the transformative potential of translating a two-dimensional concept into a three-dimensional artifact.

Fig. 2.8: Pablo Picasso, Maquette for Guitar, 1912 — a three-dimensional reinterpretation of *Guitar (I Love Eva).*
Source: Retrieved June 3, 2024, from https://www.artchive.com/artwork/maquette-for-guitar-pablo-picasso-1912/.

Fig. 2.9: Pablo Picasso, *Guitar*, 1924 — a more abstract three-dimensional work relative to the 1912 maquette.
Source: Retrieved June 3, 2024, from https://nicetopsm.best/product_details/36249387.html.

In Chapter 4, the first example among the workshop outputs likewise presents a three-dimensional interpretation of one of Picasso's guitar paintings (Figure 2.4); the foregoing observations concerning Picasso's guitar maquettes broadly apply to this student project as well.

Method

This study investigates the impact of translating abstract art from two-dimensional surfaces into three-dimensional space on design students' creative processes, using the *From Surface to Volume* workshop as its empirical basis. A qualitative research design was adopted: (a) student models were analyzed using pre-defined criteria, and (b) semi-structured interviews were conducted as a complementary data source.

Participants: All forty-four students who produced models participated. For the focus group interviews, seventeen students were purposively selected from different academic levels and experiences—one per workshop team—to ensure diversity. Participants exhibited active engagement in the workshop and were recruited on a voluntary basis.

Data Collection: Following the workshop, student models and posters were comparatively analyzed in relation to their source paintings. The analysis focused on: (1) Composition and Form; (2) Material, Color, and Texture; (3) Spatial Perception and Perspective; (4) Balance and Structural Relationships; and (5) Connections between Painting and Architecture. To enhance validity and reliability, two independent researchers evaluated the comparative analyses before finalization. Semi-structured interviews were then conducted face-to-face (approximately 15–20 minutes each), recorded on video, and transcribed for analysis.

Interview Protocol: In line with the research questions, prompts addressed:

1. *Spatial Perception and Creativity* (e.g., effects of 3D translation on spatial thinking; challenges and coping strategies),
2. *Conceptual Links between Art and Architecture* (e.g., perceived relations; influence of movements or artists),

3. *Kinesthetic Learning and Physical Modeling* (e.g., contributions of model-making; role of tactile and kinesthetic experience), and
4. *Overall Workshop Experience* (e.g., perceived impact on design processes; views on implications for design education).

Data Analysis. Interview transcripts were subjected to thematic analysis and content analysis; main and sub-themes were identified and categorized in relation to the research questions.

Reliability and Validity:

- Interview questions were reviewed by experts and revised accordingly
- Data was analyzed by two independent researchers and cross-checked for consistency
- Member checks were conducted by obtaining participant feedback following the interviews.

From Surface to Volume Workshop: The Intersection of Art and Design

All workshop outputs were presented as posters whose graphic design was also produced by the students (Figure 3). The works demonstrated that painting can be interwoven with design processes. For instance, three-dimensional projects derived from Theo van Doesburg's *Composition: Space and Time II* (Figure 4.13) provide a compelling example of how art can be integrated into design workflows. Chapter 4 presents detailed analyses of all student projects.

The workshop outputs were expected to reflect the central principles of abstract art, emphasizing the combined use of spatial composition, color theory, and geometric forms. As extracurricular practice, the workshop also proved valuable in helping students concretize abstract concepts and explore creative modes of expression.

Presentation and Evaluation of Data

The interpretation of findings comprises two interrelated strands: (1) an examination of the products created by students, and (2) an assessment of the workshop process. First, the models produced in the workshop are analyzed in terms of composition, form, use of material, color and texture, spatial perception and perspective, balance and structural relationships, and the nexus between painting and architecture. Subsequently, content analyses of the focus-group interviews are presented.

Analysis of Workshop Models

Analysis of Picasso's Guitar and the Derived Model

Pablo Picasso's *Guitar* (1912) was produced within the framework of Cubism as an experimental inquiry into the fragmentation and reconstruction of form and surface. Rejecting traditional perspective and uniting multiple viewpoints, the work focuses on representing a three-dimensional object on a two-dimensional plane. The model produced in the workshop translates Picasso's cubist composition into volumetric form, thereby materializing the artist's formal and spatial strategies as a physical construct. Analysis of the original painting and its three-dimensional reinterpretation (Figure 4.1) foregrounds three core dimensions:

1. Formal Fragmentation and Reconstruction. A central tenet of Cubism—fragmented forms and polyfocality—is rendered spatially palpable in the model through intersecting planes and geometric masses. Just as Picasso abstracts and relocates the guitar onto a planar field, the model re-produces the form architectonically in volume.
2. Materiality and Collage Aesthetics. *Guitar* reflects Picasso's exploration of collage and assemblage, blurring boundaries between painting and sculpture through paper, cardboard, and metal. The model's layered construction echoes this material logic, functioning as a physical correlation of Picasso's hybrid material language.
3. Light, Shadow, and Perspective. Rather than relying on conventional chiaroscuro, Cubism generates volumetric perception through the internal dynamics of forms. The model extends this principle into space, where real light and cast shadows interact with surfaces to activate a volumetric reading.

In sum, the model reinterprets Picasso's planar formalism as a three-dimensional architectural/sculptural artifact—an experimental probe into the implications of Cubism for space and architecture.

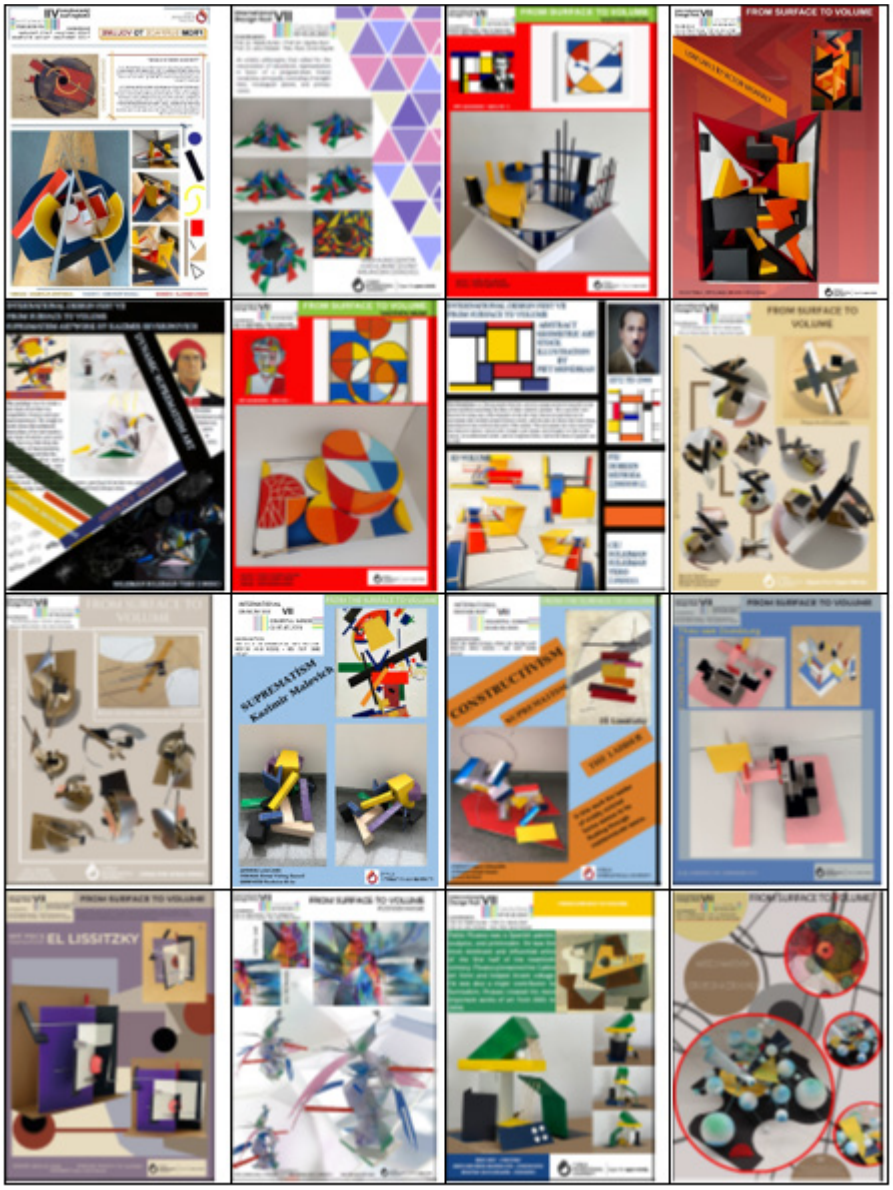

Fig. 2.3: Exhibition posters from the From Surface to Volume workshop.

This work was produced by Mais Seif, Abdulmoniem Badreldin, and Muayad Aldhubhani.

Analysis of Mondrian's Untitled and the Derived Model

As a leading figure of De Stijl, Piet Mondrian sought to reduce art to its essentials, composing with horizontal and vertical lines, primary colors (red, blue, yellow), and neutrals (black, white, grey) to transform natural irregularities into a purified, orderly structure—an endeavor grounded in both aesthetic and philosophical ideals.

The model examined here reinterprets the geometric abstraction of Mondrian's *Untitled* within a three-dimensional spatial system (Figure 4.2). The transition from surface to volume is articulated through:

1. Color and Surface Organization: The model adopts a balanced chromatic scheme analogous to the painting. Because the selected painting departs

from strict primary triads, the model similarly introduces a secondary hue (green) to reflect this deviation within a De Stijl framework.

2. Linear and Spatial Hierarchy: Mondrian's equilibrium of horizontals and verticals is translated into volumetric and structural elements; timber framing reconstructs the painting's dark linear motifs in three dimensions.
3. From Two to Three Dimensions: While the painting organizes geometry without simulating depth, the model spatializes these compositional principles through differentiated heights and recesses; notably, a yellow ceiling plane plays a decisive role in spatial organization.
4. Architecture and De Stijl: Mondrian's principles resonate strongly with architectural practice (e.g., Rietveld's Schröder House, 1924). The model can thus be read as an architectural system informed by De Stijl aesthetics.

The study demonstrates how Mondrian's geometric order and chromatic organization may be transposed into a spatial schema, offering a concrete analytic perspective on art–architecture relations and a pedagogically valuable example for design education. This work was produced by Doreen Muhoza and Suleiman Suleiman Yero.

Analysis of Mondrian's Circles and the Derived Model

A comparative reading of Mondrian's *Circles* and the workshop model (Figure 4.3) reveals that the painting's high-contrast "visual music"—constructed with primary colors and black lines—is reinterpreted in the model through softer transitions. Circular and rectilinear motifs in the painting become stratified layers in the model, gaining volume and generating spatial depth. Mondrian's principle of dynamic equilibrium is materialized as an asymmetric, layered composition that invites physical engagement. In doing so, the model extends Mondrian's surface-bound abstraction into a design language that is spatially enacted, maintaining fidelity to the artist's aesthetics while

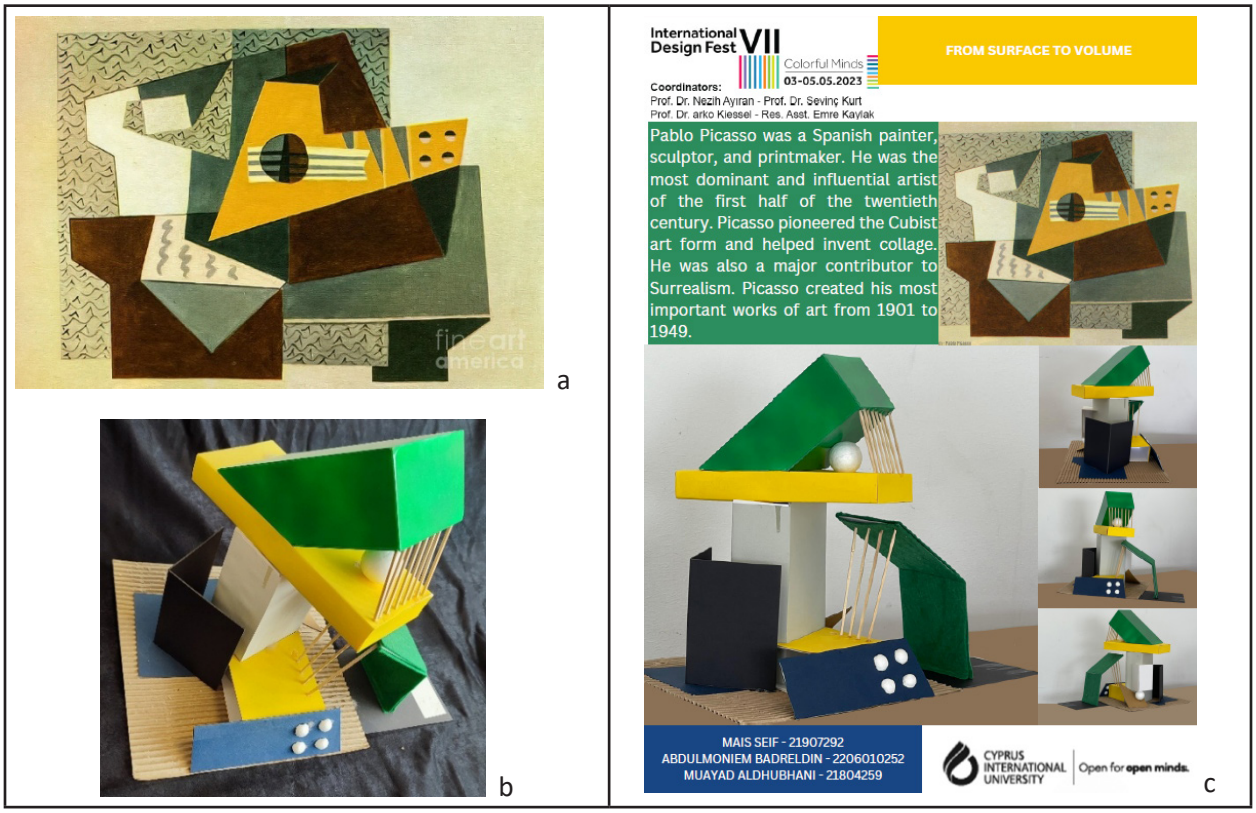

Fig. 4.1: Picasso's *Guitar* (a), model photograph (b), and poster accompanying the 3D interpretation (c).

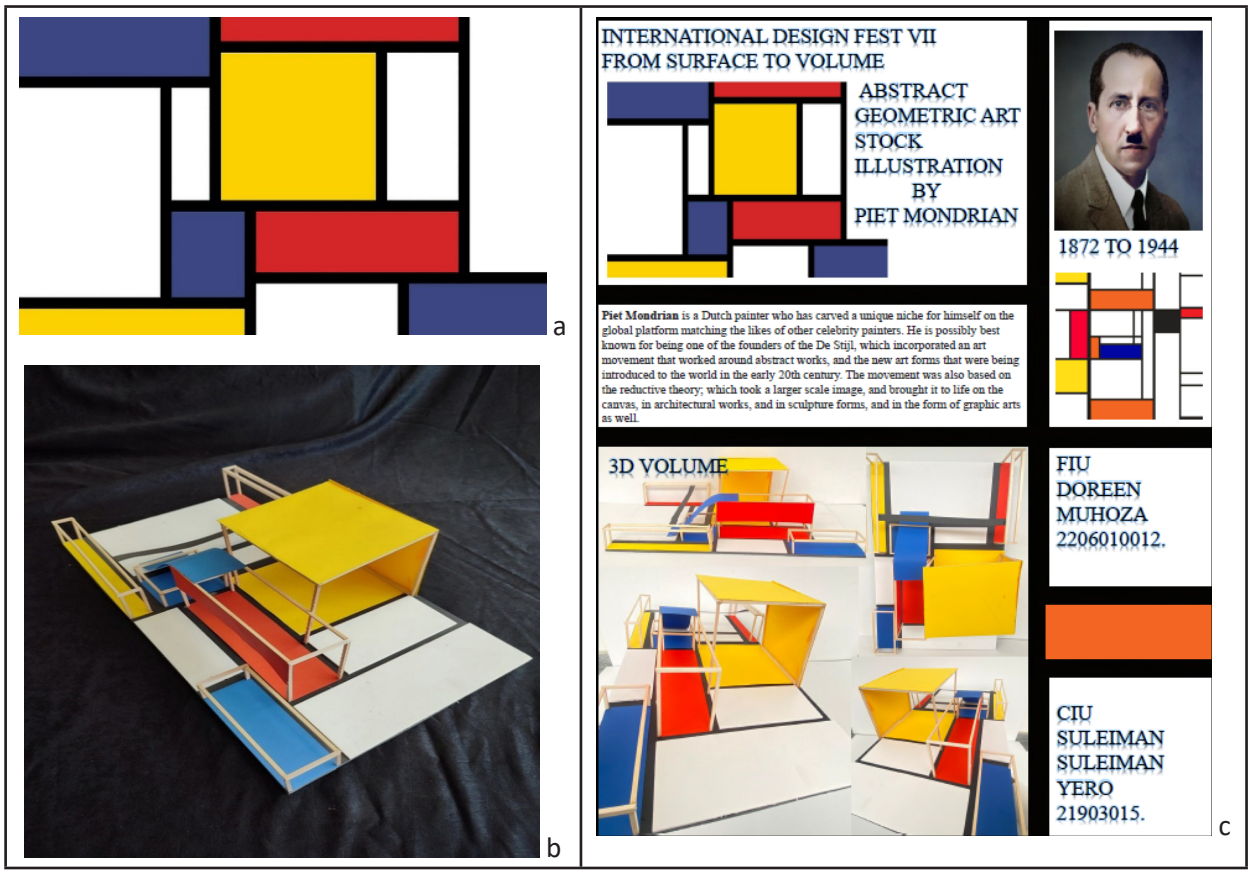

Fig. 4.2. Piet Mondrian's *Untitled* (a), model photograph (b), and poster accompanying the 3D interpretation (c).

establishing a new dialogue among color, balance, and form. This work was produced by Faruq Olamide Sokumbi, Aaol Ameal Heroe, and Yasir Adamu Dauda.

Analysis of Mondrian's Circles 6 and the Derived Model

A comparative analysis of Mondrian's *Circles 6* and the model (Figure 4.4) shows that the painting's abstraction—grounded in primary colors, black contours, and elementary geometry (Ween, 2017, p. 6)—is rearticulated in the model with the same palette. Circles and rectangles in the painting acquire volume in the model; linear elements (especially black lines) cease to operate solely as surface boundaries and assume structural roles (e.g., vertical rods). Mondrian's dynamic equilibrium is reconstructed through volumetric counterpoints and distributions of physical mass. The circle is projected onto the base plane as a spatial datum, while rectangular surfaces elevate linear elements vertically; the diagonal migrates from boundary to spatial divider. Thus the painting's abstract planes are reconceived as a three-dimensional framework, maintaining equilibrium through calibrated relations among geometric forms and color blocks. Although formally stable, the composition produces a compelling sense of motion, encouraging circumambulatory viewing and perspectival variation. Materially, volumetric components in cardboard, plastic, or wood endow abstract linear forms with palpable presence; black "lines" function as load-bearing members, and colored planes describe spatial voids—transforming surface abstraction into a spatial construct that can be apprehended from within as well as without. This work was produced by Zümrüye Günakar and Yunus Emre Okumuş.

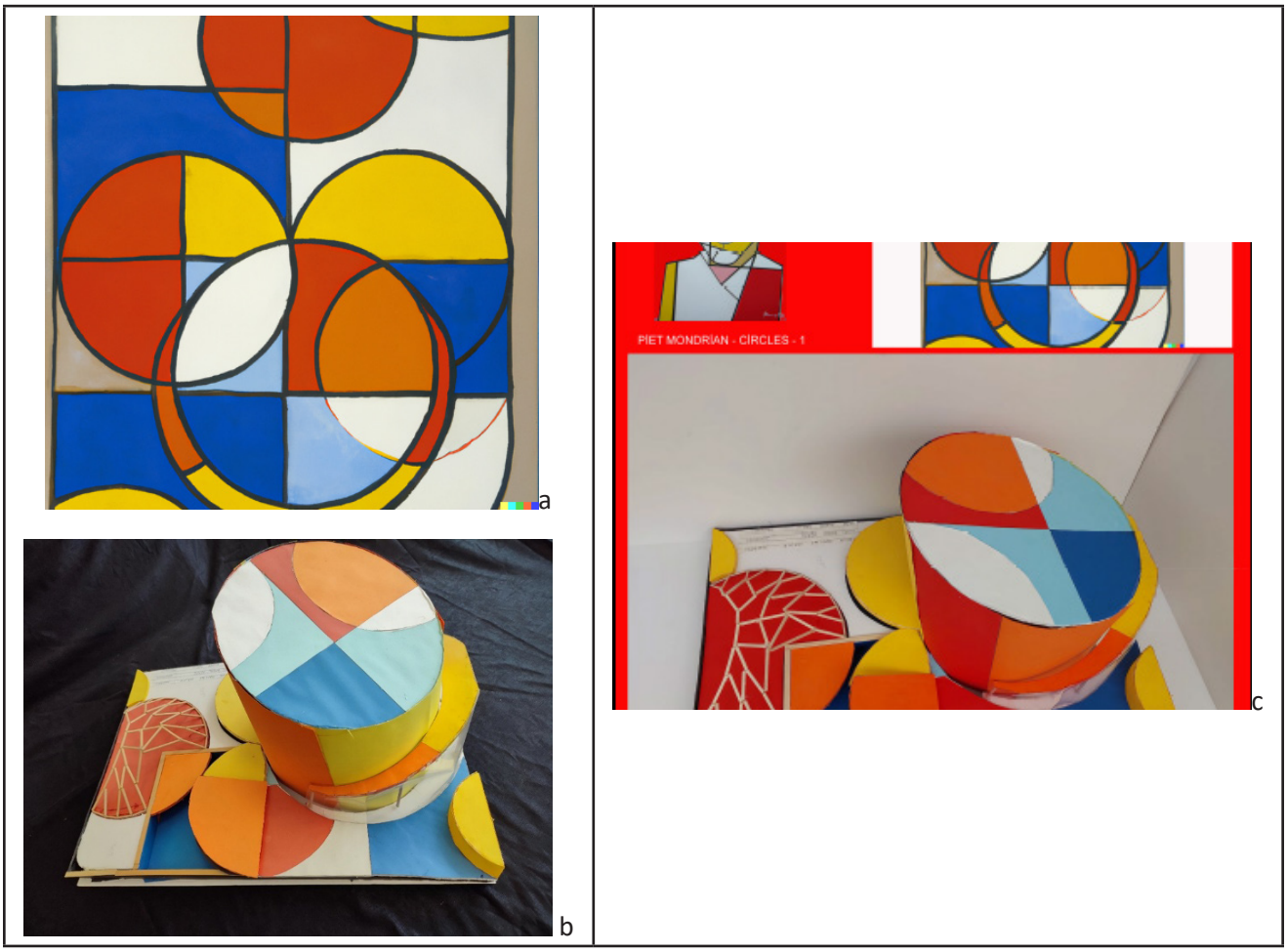

Fig. 4.3: Mondrian's *Circles* (a), model photograph (b), and poster accompanying the 3D interpretation (c).

Analysis of Mondrian's Blended Space and the Derived Model

A comparative analysis of Mondrian's *Blended Space* and the model (Figure 4.5) indicates that the painting's dynamic equilibrium—established through primary colors and sharply articulated geometric forms bounded by black lines—has been reinterpreted. The model shifts the palette toward secondary hues (e.g., green, purple), intentionally departing from the canonical primaries (e.g., the omission of yellow) as a deliberate strategy within the spatial translation. Color operates not merely as surface accent but as a defining attribute of volumetric elements, while the role of black lines is assumed by interstitial voids.

In the original two-dimensional composition, triangular and circular forms establish a dynamic visual rhythm that gains spatial depth in the model through layered structures and volumetric arrangements. Mondrian's concept of dynamic equilibrium is reinterpreted in the model via spatial contrasts and the interplay of solid and void. While the overlapping of forms of varying scales appears to produce visual instability, the overall composition maintains a balanced spatial distribution.

The relationship between emptiness and solidity generates a continuous sense of movement in the viewer's perception. In the model, geometric forms detach from the surface to become volumetric entities. Triangular and angular components are layered to form a multi-planar composition, producing a sense of depth and allowing the viewer to experience space from multiple perspectives.

In this translation, the circular center of the painting

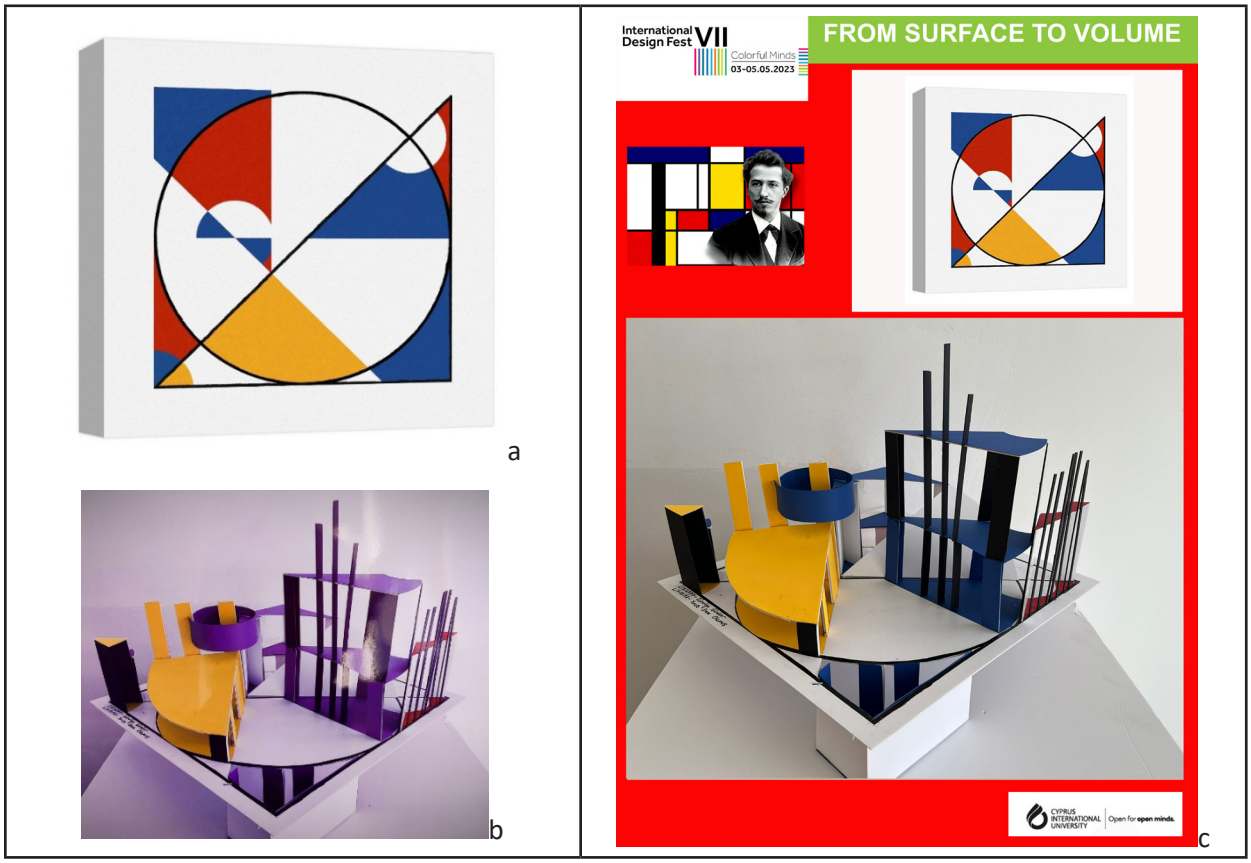

Fig. 4.4. Mondrian's Circles 6 (a), model photograph (b), and poster accompanying the 3D interpretation (c).

is preserved as a physical void, around which surrounding forms act as spatial frames. Thus, the model sustains Mondrian's aesthetic principles while transforming them into a three-dimensional interpretation aligned with contemporary approaches to art and design.

From a chromatic standpoint, the primary colors associated with blue in the original work are reinterpreted following a complementary contrast principle: red is paired with green, and yellow with purple, generating a renewed visual dynamic through oppositional harmony. Whereas Mondrian's surfaces are smooth and planar, the model is constructed from diverse materials such as plastic, cardboard, and foam. These materials break the uniform surface texture, adding tactile variety and material richness.

Moreover, the physical gaps between geometric elements invite the perception of the surface not merely as a pictorial plane but as a spatial construct. The abstraction in the painting—seemingly chaotic yet internally ordered—manifests as a geometric harmony, a quality that is faithfully preserved in the model. This study was conducted by Hamza Alkai, Joudi Al Akkad, and Mirlan Eseno.

Analysis of El Lissitzky's Proun A-2 (Intersecting Planes) and the Derived Model

El Lissitzky's *Proun A-2* (Figure 4.6a) is a two-dimensional composition that mobilizes perspectival illusion within a Suprematist-Constructivist vocabulary. Geometric forms, balanced along vertical and horizontal axes, are organized within a circular frame. Overlapping planes generate the sensation of depth without constituting an actual three-dimensional space; the circular boundary encloses and concentrates the viewer's attention. Hard edges, right angles, and high-contrast tonalities produce dynamic tension among the planes.

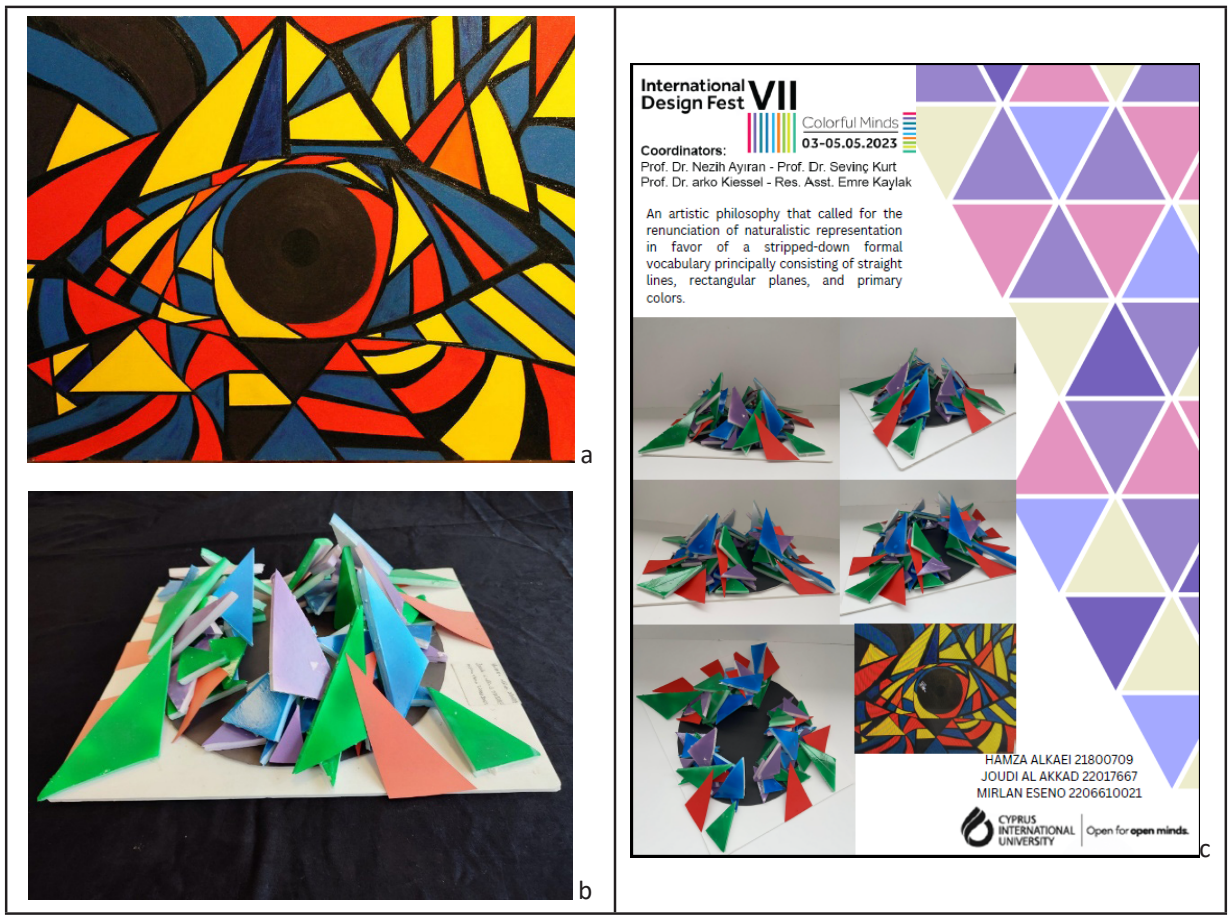

Fig. 4.5. Piet Mondrian's *Blended Space* painting (a), model photograph (b), and poster of the three-dimensional interpretation (c).

The workshop model (Figure 4.6b) confers spatial agency on these pictorial strata by translating differently angled and layered planar elements into intersecting volumetric forms. The abstract equilibrium of the painting is reconstituted in three dimensions through calibrated relations of mass, volume, and void. Structural stability is achieved by means of a clearly articulated and dynamic compositional system. Whereas color contrasts and linear regulation create depth in the painting, the model enriches perception through material heterogeneity (e.g., wood, foam, cardboard), textural counterpoints, and physically balanced assemblies. In the painting, balance is secured by the (a)symmetrical placement of geometric elements; the axial relations—reinforced by axonometric cues—sustain both stasis and implied motion. In the model, some components appear suspended while others are grounded to stabilize mass distribution.

In keeping with Lissitzky's Proun project—conceived as a threshold between painting and architecture—the model operationalizes his theoretical stance as a physical prototype. It concretizes a process in which art evolves toward architecture and may be understood as a concept-development study antecedent to a building or sculptural form. This work was produced by Beyza Gezen, Besma Mohammed, and Burak Göksuçukur.

Analysis of El Lissitzky's Composition and the Derived Model

El Lissitzky's *Composition* (Figure 4.7a) comprises intersecting rectangular planes and a central circular form. Layering generates a three-dimensional

effect on a two-dimensional surface—an optical, not physical, depth. The work orchestrates tension between balance and motion, drawing the gaze toward the center. The model (Figure 4.7b) transposes the perspectival illusion into actual space, rendering interplanar voids tangible and re-coding planar relations as horizontal and vertical spatial elements. As a result, volumetric depth becomes pronounced and forms vary perceptually with changes in viewpoint.

Chromatically, the painting privileges neutral tones—purple, black, grey, and white—while a red circle introduces focal contrast and consolidates the center. The model maintains a comparable palette but augments perception through tactile materials (cardboard, metal rods, varied surface finishes). The volumetric articulation of the red circular form amplifies its centrality.

In sum, the pairing demonstrates the passage from surface to volume, and from visual to physical space—a concrete manifestation of the theoretical bridge that Lissitzky constructs between art and architecture. This work was produced by Berkcan Adalı, İbrahim Can Aydoğan, and Praise God Oseyili.

Analysis of El Lissitzky's Preliminary Sketch for a Poster and the Derived Model

In *Preliminary Sketch for a Poster* (Figure 4.8a), rectangular, circular, and linear elements are arranged upon a circular ground. Intersections and overlaps animate the composition; the red-black contrast intensifies its energy. The model (Figure 4.8b) volumetrizes these planar elements to produce a spatial—indeed sculptural—configuration: planes bend, curve, and fold, heightening the sense of motion and strengthening inter-form interaction in physical space.

The painting deploys red, black, yellow, and grey in smooth, uniform fields, using chromatic contrast

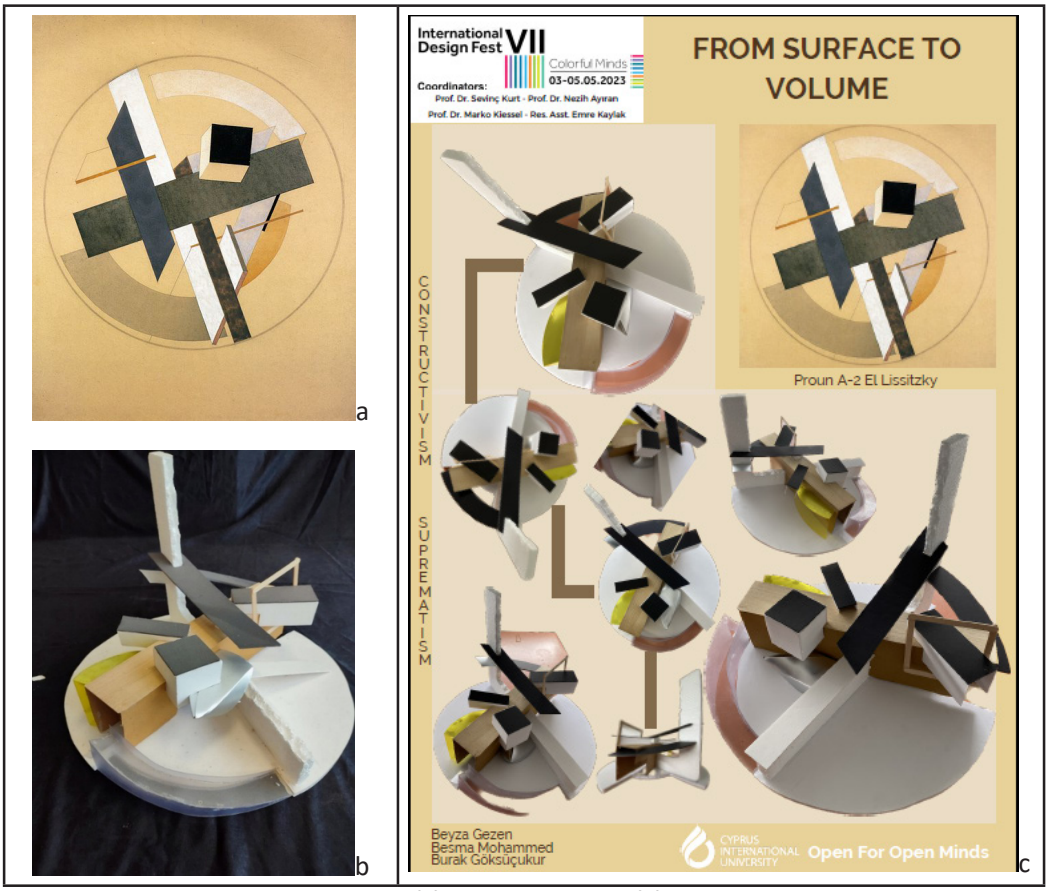

Fig. 4.6: El Lissitzky, *Proun A-2 (Intersecting Planes)* **(a); model photograph (b); poster accompanying the 3D interpretation (c).**

to calibrate visual weight. The model preserves the palette but, owing to material properties, color is perceived differently: yellow and red read as brighter, more volumetric accents, while black deepens recession; textural variety enriches spatial cognition. Depth in the painting is an optical construct of overlap and extension; in the model it becomes a material reality, inviting multi-perspectival viewing. Inclined planes and stacked layers concretize relations of volume and void, and the composition is balanced to ensure structural stability.

Collectively, the transformation reconstructs Lissitzky's dynamic equilibrium as spatial practice, clarifying pathways through which painting interfaces with architecture. This work was produced by Hanifa Abdalla, Lenah Mohamed, and Josephine Adjabeng.

Analysis of El Lissitzky's Untitled and the Derived Model

A comparative analysis of Lissitzky's *Untitled* and its model (Figure 4.9) shows that the painting constructs dynamic balance through superposed rectangular blocks and linear elements, while the model translates these abstract planes into volumetric masses, thereby securing physical depth and spatial interaction. Warm chroma (red, yellow, orange) contrasts with a neutral ground in the painting; the model intensifies perception via material diversity, introducing textural richness and volumetric emphasis. Depth that is illusory on the surface becomes actual in three dimensions, and equilibrium is achieved not only visually but also structurally through a complex, rationalized assembly. The comparison underscores

Fig. 4.7: El Lissitzky, *Composition* (a); model photograph (b); poster accompanying the 3D interpretation (c).

the transfer from surface to volume and the architectural potential of abstract composition. This work was produced by Yağmur Altınyüzük, İremgül Alaşa, and Divind Abraham.

Analysis of El Lissitzky's Proun SK and the Derived Model

El Lissitzky's *Proun SK* and the workshop model (Figure 4.10) exemplify the transition of abstract geometry from pictorial surface to spatial structure. In the painting, circular trajectories, rectangular planes, and linear vectors establish a dynamic equilibrium across horizontal and oblique axes. The composition balances forms of differing scales within an asymmetrical yet coherent order.

The model materializes this logic: curvilinear lines become curved surfaces, rectilinear fields become solid masses, and diagonal members tie these components structurally. The result clarifies the composition's dynamism while imparting a sculptural character and rhythmic movement. Overlap and shading in the painting simulate depth; in the model, depth becomes experiential, with distances and voids legible from multiple viewpoints. The painting's reduced palette (earth tones, black, white, orange) yields smooth, homogeneous fields; the model retains this range but varies perception through surface finishes (glossy, matte, reflective). Accents in yellow, red, and blue project volumetric elements forward. Overall, the model offers a meaningful volumetric interpretation that—by virtue of its avant-garde Constructivist inflection—can be read as a reflection of painting within architectural thinking. This work was produced by Oya Güçer, Rofiat Folami, and Samantha Angbea.

Fig. 4.8: El Lissitzky, Preliminary Sketch for a Poster (a); model photograph (b); poster accompanying the 3D interpretation (c).

Analysis of Malevich's Untitled Suprematist and the Derived Model (Group 1)

Kazimir Malevich's *Untitled Suprematist* was interpreted by two groups in distinct ways. The models enable close study of how Suprematist abstraction migrates from a two-dimensional field into three-dimensional spatial structure. In the painting, rectangles, squares, and lines are dynamically arranged with vivid chromatic contrasts to establish visual balance. The Group 1 model (Figure 4.11) organizes volumetric counterparts to these forms in proportion to the original composition. While both painting and model employ saturated, contrasting hues, the model intentionally suppresses red in favor of a yellow-purple antagonism. This strategy concentrates attention on the largest prismatic mass (yellow) by enveloping it with a contrasting volume, thereby consolidating a focal zone.

Whereas depth in the painting is an optical construct achieved through overlap and color contrast, depth in the model is realized through mass displacement and spatial stacking. Balance is achieved not only as a visual effect but also structurally, through a carefully engineered assembly. The comparison, therefore, foregrounds the passage from surface to volume and the architectural/design potential of abstract composition; Malevich's work exemplifies the spatial ambition and interdisciplinary transposability of Suprematism. This work was produced by Lois Embo, Ahmet Yıldıray Serenli, and Soukaina Kirba.

Analysis of Malevich's Untitled Suprematist and the Derived Model (Group 2)

The second model inspired by Kazimir Malevich's *Untitled Suprematist* diverges markedly from the first interpretation (Figure 4.12). In this reading, the designer proceeds as if the painting were itself an abstraction of an already coherent volumetric entity:

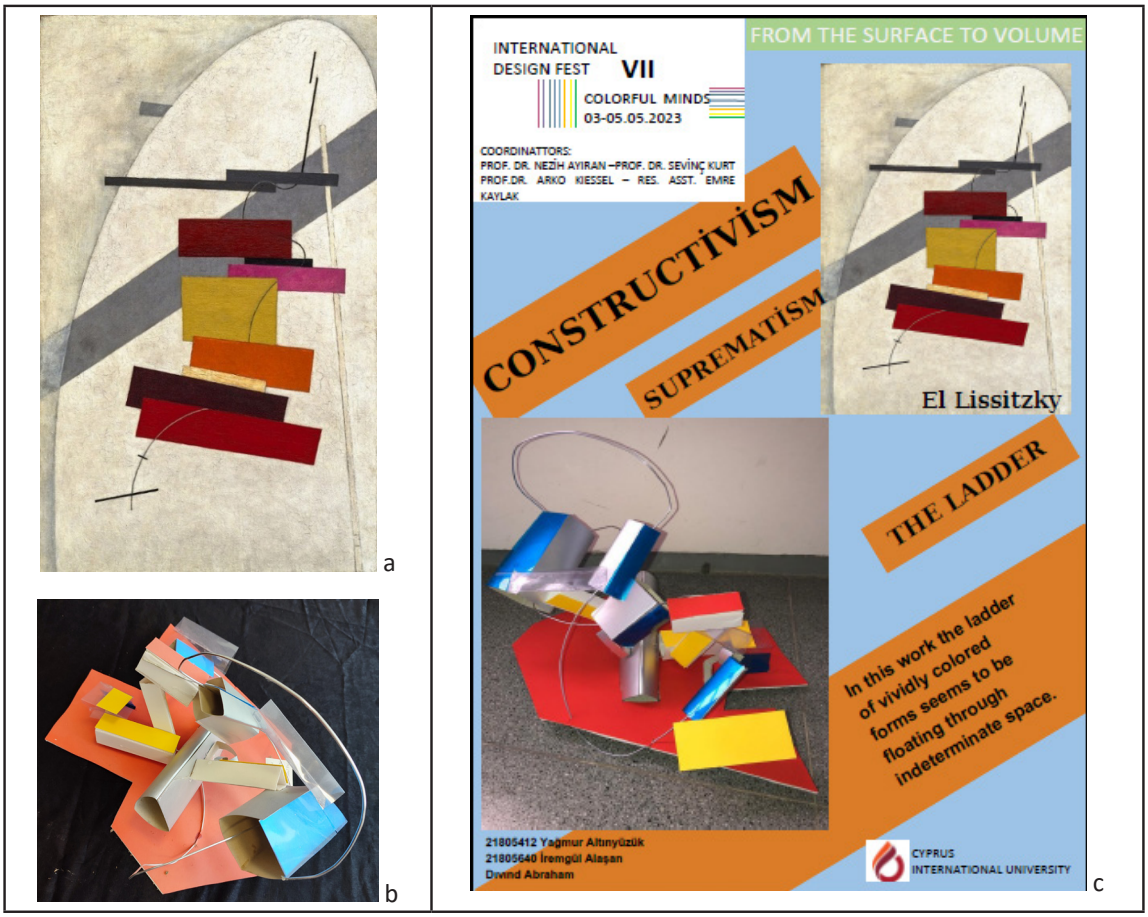

Fig. 4.9: El Lissitzky, *Untitled* (a); model photograph (b); poster accompanying the 3D interpretation (c).

the process is conceptually reversed by positing a prior mass and then abstracting it back to the pictorial field. The author interprets the beige ground as concealing unseen layers of a three-dimensional volume; the faint triangular cues in the painting are read as indices of pyramidal geometries latent in these hidden strata, while curvilinear elements are deployed—counterintuitively—as instruments of balance.

Chromatically, the model intensifies abstraction relative to the canvas, enacting a dual strategy in which two-dimensional and three-dimensional characteristics are conceptually interwoven. The result is a meditation on the reciprocal translation of surface and volume. This work was produced by Suleiman Yero.

Analysis of Theo van Doesburg's Composition: Space and Time II and the Derived Model

In Theo van Doesburg's *Composition: Space and Time II*, visual equilibrium is achieved through a disciplined arrangement of rectilinear forms and primary colors (red, blue, yellow). The model (Figure 4.13) translates these planar forms into volumes, enabling concrete spatial interaction. The vertical-horizontal dialectic emphasized in the painting is retained and amplified; whereas depth on the canvas is conveyed through overlap and chromatic contrast, in the model depth appears as structural character and spatial stacking.

Despite local challenges, a balance is established between ground-bound elements and components that rise—sometimes assertively, sometimes delicately—above the base plane. Where the base is broad, the composition reads as more static; where it narrows, surfaces detach and become dynamically elevated. Two notable reinterpretations distinguish the model: the inversion of black-white ratios and the substitution of pastel pink for blue. The black-white reversal enhances legibility of the third dimension, while pastel pink—invoking Rococo associations contrary to modernist austerity—

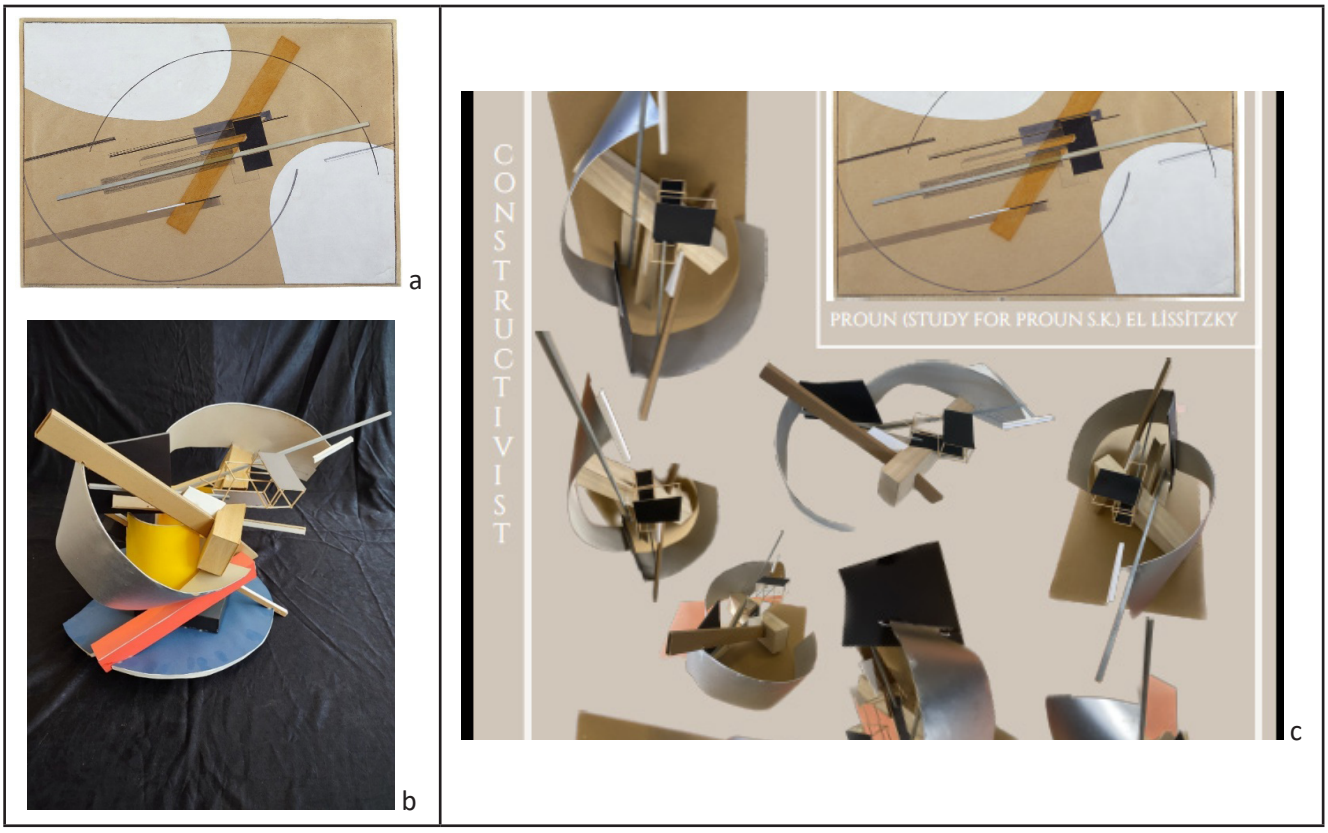

Fig. 4.10: El Lissitzky, *Proun SK* **(a); model photograph (b); poster accompanying the 3D interpretation (c).**

Fig. 4.11: Kazimir Malevich, Untitled Suprematist Composition (a); model photograph (b); poster accompanying the 3D interpretation (c).

serves a temporal allusion by deliberate contrast. This work was produced by Eliel Kabance Yav.

Analysis of Wassily Kandinsky's Circles in a Circle and the Derived Model

Wassily Kandinsky's *Circles in a Circle* (Figure 4.14a) orchestrates concentric and intersecting circles with linear vectors to generate a poised yet animated equilibrium, the black circular frame delimiting a field of ordered complexity. In the model (Figure 4.14b), circles become spheres, and linear elements are realized as rods, constructing a three-dimensional armature that spatializes the painting's abstract motion. Variegated sphere sizes induce a sense of differential elevation.

While the painting's colors are evenly distributed, the model adopts a more dynamic chromatic deployment: spheres receive graded transitions and spray effects to suggest motion; yellow planar accents and a black base intensify compositional weight. The migration from illusory depth (overlap, contrast) to actual depth is accomplished through axial supports and a clearly articulated structural logic. Conceptually, the model extends Kandinsky's abstraction toward cross-disciplinary resonances—music, mathematics, cosmology—evoking atomistic or planetary analogies and demonstrating how abstract art can intersect with scientific narration. This work was produced by Mahdiyeh Darigh, Ali Aburagiba, and Abdurrahman Hadash.

Fig. 4.12: Kazimir Malevich, *Untitled Suprematist Composition* **(a); model photograph (b); poster accompanying the 3D interpretation (c).**

Analysis of Wassily Kandinsky's Untitled and the Derived Model

Kandinsky's *Untitled* (Figure 4.15a) mobilizes triangles, squares, circles, intersecting lines, and sinuous curves to produce a multi-layered composition energized by strong diagonals. The model (Figure 4.15b) grants volume to these elements via rods and plates; delicate lines are rebuilt as threads and wooden dowels, forming a spatial lattice that reinforces the work's dynamic character.

The painting features saturated chroma (red, yellow, blue, green) applied in uniform fields to intensify depth through contrast. By contrast, the model limits color, emphasizing material tones (wood, black and white planes), with selective translucent blue accents to underscore dynamism rather than hue. The result is a transformation of the painting's abstract syntax into an architectural installation, a spatial experience as much as an art object. This work was produced by Naomi Akilimai, Amal Alfatih, and Phanelia Koye.

Analysis of Victor Vasarely's Lom Lan 2 and the Derived Model

Victor Vasarely's *Lom Lan 2* (Figure 4.16a) is constructed from sharp geometries—interlocking triangles, rectangles, and parallelograms—organized

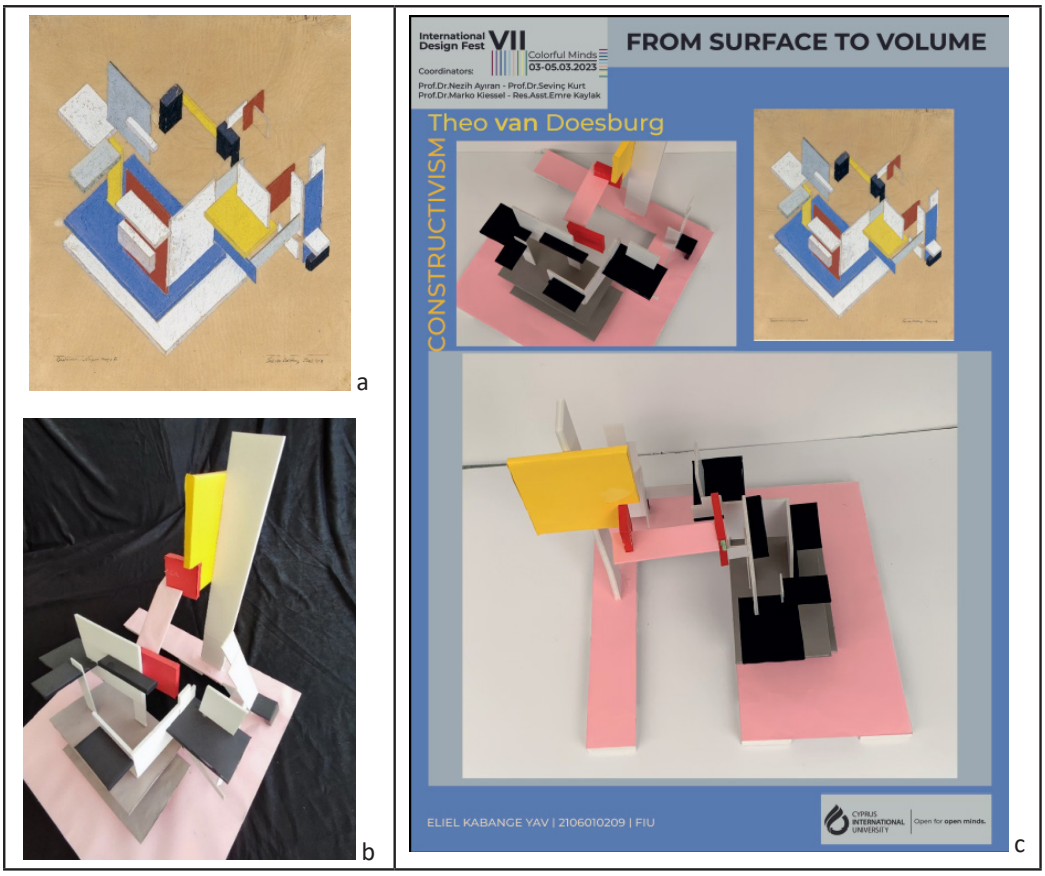

Fig. 4.13: Theo van Doesburg, Composition: Space and Time II (a); model photograph (b); poster accompanying the 3D interpretation (c).

through right angles and high-contrast chroma (black with red, orange, and yellow). Perspective cues and layered geometry create a potent illusion of depth on a planar surface. The model (Figure 4.16b) converts these cues into actual spatial relations: prismatic volumes are stacked and interpenetrate, angled planes and transparent sheets articulate nested structures, and the optical field becomes an embodied spatial experience.

While the painting's palette remains, the model reassigns color as a spatial descriptor, demarcating voids as well as solids. Transparency and reflectivity introduce light-based phenomena (refraction, reflection), producing dynamic shadow play and multi-layered readings unavailable to the static surface. Visual equilibrium in the painting arises from asymmetrical yet balanced placement; in the model, gravitational and structural constraints require engineered stability—triangular supports, block allocations, and connections between transparent elements. The outcome confirms the architectural potential of Op Art logics when translated into volume. This work was produced by Vincent Ikoja, Faith Lungu, and Sephora Soki Luwawu.

Analysis of Tim Parker's Crystal Ship and the Derived Model

Tim Parker's *Crystal Ship* (Figure 4.17a) assembles acute-angled polygons into crystalline clusters, enlivened by curvilinear vectors that counterpose the planar geometry. The model (Figure 4.17b) renders the crystalline idiom as three-dimensional prisms and multi-faceted forms; thin, curved transparent planes intensify fluidity and motion.

The painting's vibrant color transitions (pink, purple, blue, orange, yellow) simulate refracted light

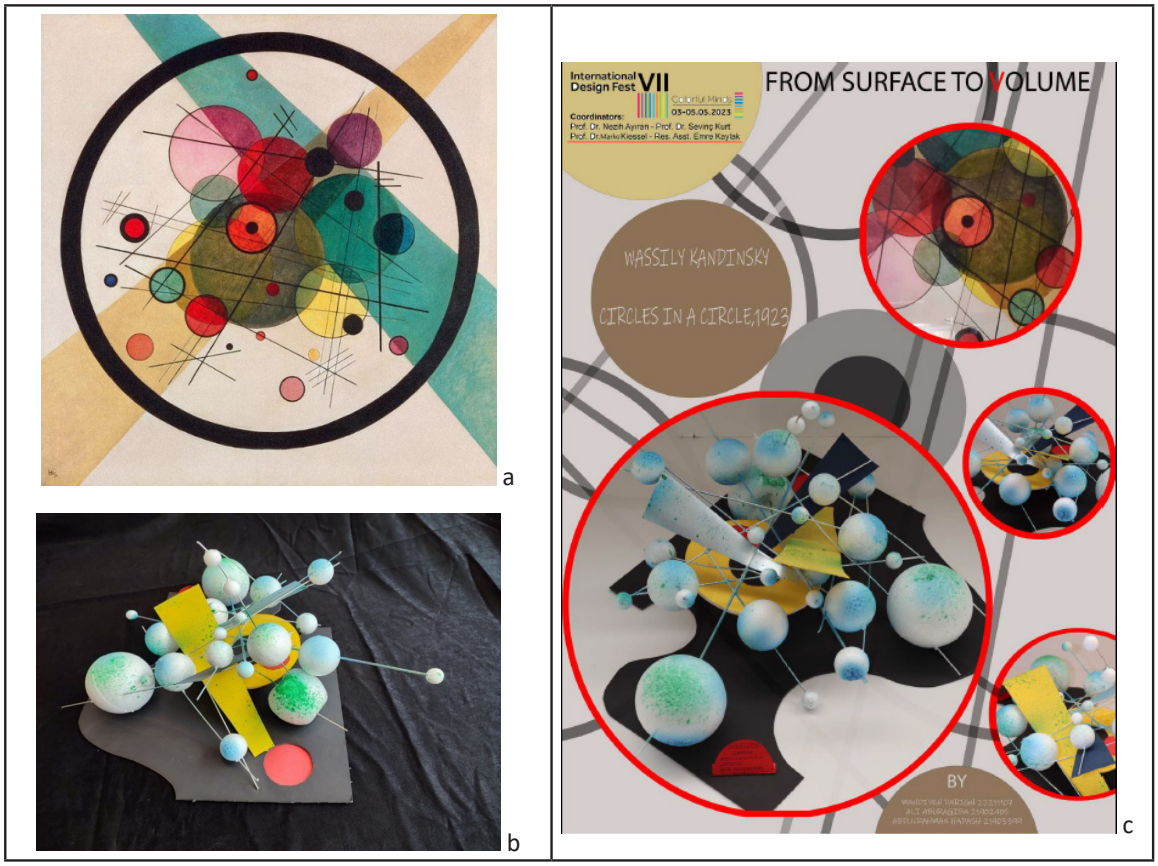

Fig. 4.14: Wassily Kandinsky, Circles in a Circle (a); model photograph (b); poster accompanying the 3D interpretation (c).

across crystal surfaces. The model adopts a pared-back chromatic approach—predominantly white with pastel accents and transparent media—so that reflectance and transmission of light generate the perceived chromaticity. Intersecting prisms and layered transparencies invite multi-axial viewing, while slender structural members, angled plates, and occasional tension lines ensure stability without compromising delicacy. The result is a composition balanced aesthetically and structurally, translating optical complexity into a choreographed spatial experience. This work was produced by Eda Şanbulan, Ali Kağan Kaya, and Valeria Matvichuk.

Evaluation of the Analyses of Works and Derived Models

The translation of two-dimensional abstract artworks into three-dimensional models enabled an assessment of students' capacities in artistic interpretation, spatial perception, compositional order, and structural balance. Drawing on works by El Lissitzky, Kazimir Malevich, Theo van Doesburg, Wassily Kandinsky, Victor Vasarely, and Tim Parker, the student projects that spatialized abstract geometric compositions were evaluated across six domains:

Transformation of Composition and Form

- *Three-dimensional rearticulation of form:* Planar triangles, circles, and rectangles were reconceived as prismatic, spherical, and volumetric entities, producing not only visual but also **material** depth.
- *Relations of void and solid:* Students analyzed positive/negative fields in the source works and strategically employed voids in the models, yielding compositions that read as both dynamic and balanced.

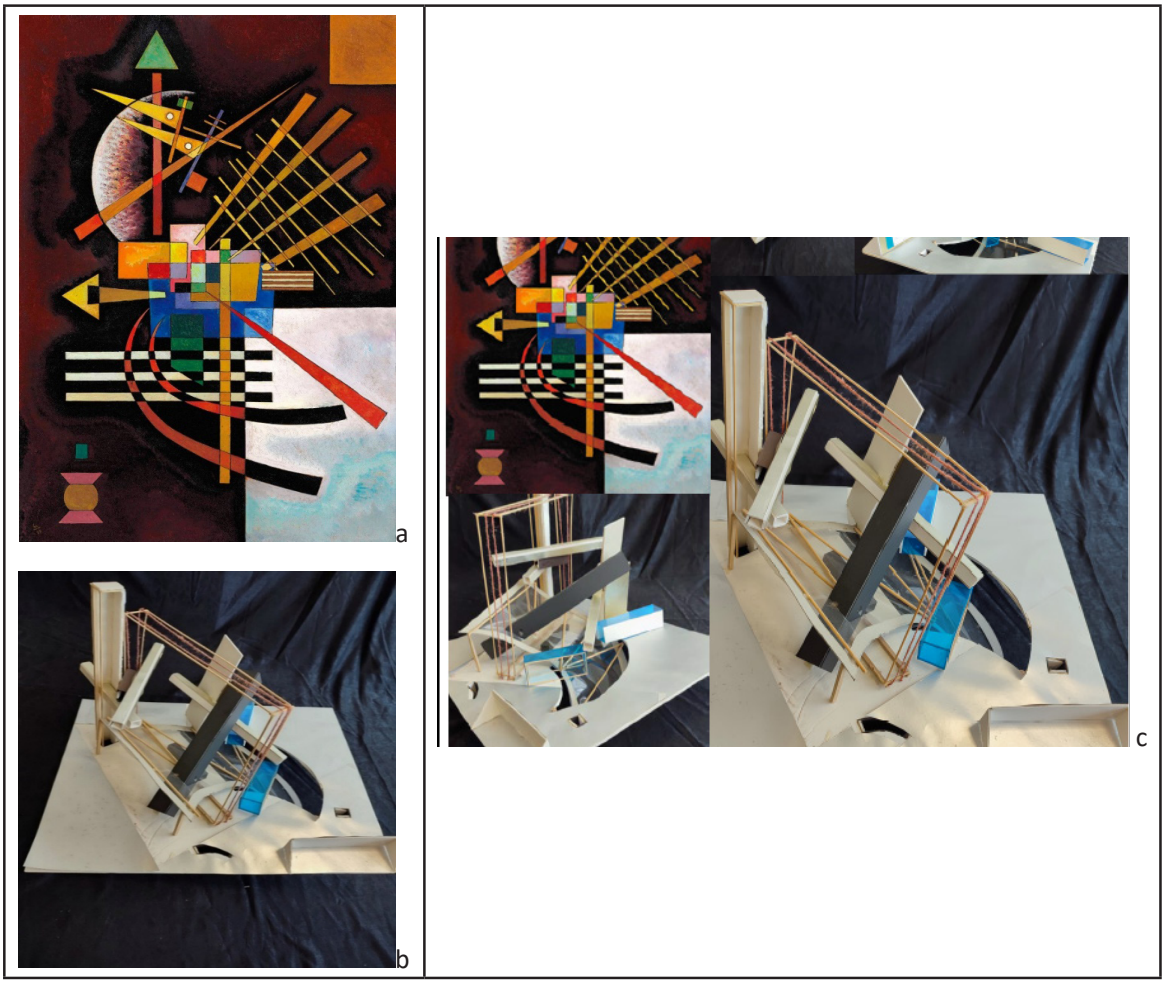

Fig. 4.15: Wassily Kandinsky, Untitled (a); model photograph (b); poster accompanying the 3D interpretation (c).

Spatial Perception and Perspective

- *Stratified depth:* Layering at differentiated heights concretized depth perception and afforded multi-perspectival readings as viewers moved around the models.
- *Kinetics of form:* Curvilinear vectors, diagonals, and asymmetric arrangements intensified a sense of motion—particularly in models inspired by Kandinsky and Lissitzky.

Color and Texture

- *Chromatic emphasis in space:* Colors that functioned as homogeneous surface fields in the paintings were assigned to discrete volumes in the models, sharpening focal hierarchies through contrast.
- *Material and surface:* Transparent plastics, cardboard, wire, and foam facilitated light-color interactions; textual variety and shadow play reinforced spatial depth.

Structural Balance and Stability

- *Visual vs. physical equilibrium:* Despite frequent asymmetry, students achieved stability by managing centers of gravity—using slender rods, prismatic struts, and cross-bracing where necessary.
- *Gravity as design parameter:* Forms that were "free" on the picture plane were reorganized to address gravitational load in space; suspended, seemingly anti-gravita-

Fig. 4.16: Victor Vasarely, Lom Lan 2 (a); model photograph (b); poster accompanying the 3D interpretation (c).

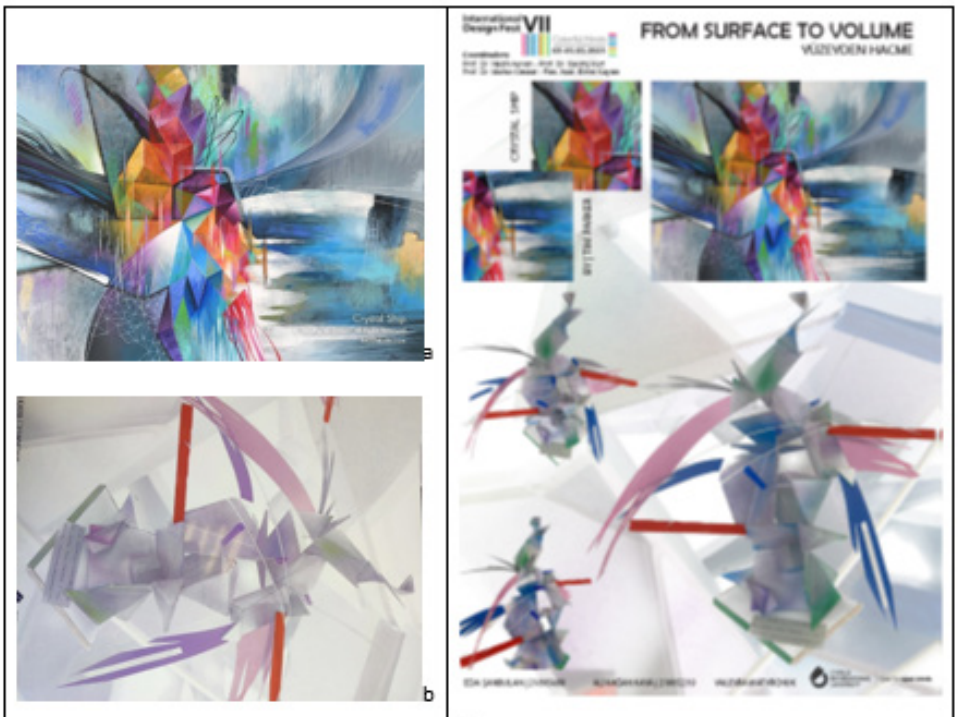

Fig. 4.17: Tim Parker, Crystal Ship (a); model photograph (b); poster accompanying the 3D interpretation (c).

tional elements were common, often imparting an avant-garde Constructivist character.

Conceptual and Creative Interpretation

- *Fidelity to authorship:* Many models preserved the essence of the source artists' styles when adapting them to spatial terms.
- *Re-interpretation:* Several projects introduced new forms and configurations, evidencing students' autonomous interpretive agency.

Interdisciplinary Framing

- *Art-architecture interface:* Models derived from De Stijl and Suprematism frequently exhibited architectural planning logics and structural reasoning.
- *Mathematical-geometric reasoning:*_Proportion, symmetry/asymmetry, and perspectival rules informed geometric ordering across projects.

Analysis of the Semi-Structured Interviews

As outlined in the Methods section, semi-structured interviews complemented model analysis. Thematic analysis proceeded through transcription, coding, and categorization into four domains: Key findings include:

As explained in the **methodology section**, in addition to the evaluation of models, data was also collected through semi-structured interviews to answer the research questions. The analysis of the data obtained from the focus group followed the thematic analysis process outlined below:

1. Transcription of Data: The interviews were recorded and transcribed into written text.
    - *Coding:*_The data was coded according to the keywords and concepts emphasized by the students.
2. Defining Themes:
    - *Thematic Classification:* The coded data were then categorized into four main thematic categories as follows: Spatial Perception and Creativity; Connections Between Art and Architecture; Kinesthetic Learning and Physical Modeling; Learning Motivation and Originality,
3. Interpretation of Data: The identified themes were analyzed and interpreted within an academic framework to understand students' experiences and reflections.

Based on this analysis, specific findings and observations were derived from the interviews.

Findings from Semi-Structured Interviews

The Impact of Transforming Abstract Works into Three-Dimensional Models

Students reported that the process of transforming two-dimensional abstract compositions into three-dimensional spatial structures significantly enhanced their spatial thinking abilities. This process strengthened their visual analysis, form generation, and understanding of volumetric relationships. They emphasized that exploring the depth, scale, and proportion of geometric structures substantially expanded their perception of space.

Challenges and Solutions: Students identified the following as the main challenges encountered during the transformation of abstract works into three-dimensional models:

- Translating perspectival illusions from a flat surface into tangible spatial structures.
- Balancing color, light, and shadow effects with volumetric components.
- Maintaining the dynamic character of the original artwork while achieving structural balance and stability.

To overcome these difficulties, students employed methods such as experimental modeling, layered constructions, material diversity, and analyses of abstract forms.

Conceptual Connections Between Art and Architecture

Understanding the Relationship Between Abstract Art and Architecture: Students stated that this workshop made a substantial contribution to their understanding of the interconnections between art and architecture. It was understood that abstract art serves not only as a two-dimensional visual expression but also as a tool for developing spatial concepts.

Key insights emphasized by students included:

- Artistic movements such as Suprematism and De Stijl are directly related to architecture.

- The geometric compositions in abstract artworks can inspire concept development in architectural design.
- Art represents not merely an aesthetic expression, but also an organizational approach to space.

Art Movements and Artists as Sources of Inspiration: Students analyzed how specific art movements and artists guided their spatial thinking during the workshop.

Notably:

- The geometric compositions of *El Lissitzky* and *Kazimir Malevich* inspired modular spatial configurations.
- *Wassily Kandinsky's* dynamic linear compositions enabled students to explore concepts of movement and balance during modeling.
- *Victor Vasarely's* optical illusions encouraged students to translate perceptual depth from two-dimensional surfaces into three-dimensional structures.

These findings demonstrate that artworks function not merely as aesthetic objects, but as conceptual frameworks encompassing architectural principles such as space, rhythm, balance, and motion.

Kinesthetic Learning and Physical Modeling

Contribution of Physical Model-Making to Design Skills: Students reported that the process of physical model construction made a significant contribution to their design thinking skills. Working manually and directly with materials provided a tactile and intuitive learning experience, in contrast to digital design environments.

Advantages of Learning Through Model-Making:

- A deeper understanding of the relationship between material and structure.
- Enhancement of creativity through experiential learning.
- Development of the ability to adapt and iterate through trial and error.
- Improved capacity to analyze the spatial behavior of abstract forms in real-world contexts.

Tactile and Sensory Experience in the Design Process: Students emphasized that tactile engagement and physical interaction with materials introduced a new dimension to the design process. Touching materials, assembling components, and working with physical scales improved their spatial awareness.

This experience supports Pallasmaa's (2005) argument that design is not purely a visual process but also a physical and haptic one. Students noted that working with real materials —as opposed to digital simulations— enhanced their awareness of spatial relationships and sensory perception.

Overall Workshop Experience and Its Impact on Design Education

General Contributions to the Design Process: Students asserted that such workshops make a substantial contribution to design education and creative development, particularly by enabling them to:

- Cultivate multidimensional perspectives and experimental thinking in the design process.
- Translate abstract concepts into spatial realities. Experience the physical aspects of design through direct engagement with materials and structures.
- Understand the interdisciplinary relationship between art, architecture, and design.

Impact on Architectural and Design Education:

Students emphasized that integrating such workshops into architectural and design curricula would enrich education by fostering abstract reasoning, spatial awareness, and creative problem-solving.

Key educational impacts included:

- Developing alternative learning pathways through physical modeling, beyond traditional drawing and digital methods.
- Discovering how abstract concepts can be translated into the material world.
- Promoting interdisciplinary thinking by merging the technical and conceptual dimensions of art and design.

Learning Motivation and Creativity: Students highlighted that extracurricular workshops differ from conventional, grade-oriented learning, as

they promote intrinsic motivation and creative exploration. They described the experience as enjoyable, liberating, and discovery-based, emphasizing that such activities increase individual motivation and encourage self-directed learning and creative development.

Conclusion and Evaluation

The interaction between two- and three-dimensional modes of expression expands the boundaries of art and unveils new creative potentials. The *"From Surface to Volume"* workshop highlighted the educational and artistic significance of this interaction. Through the three-dimensional reinterpretation of abstract art, students not only enhanced their spatial perception but also established a creative dialogue between the past and the present, bridging a century of artistic evolution.

Overall, the analysis of seventeen models demonstrated that students successfully interpreted the principles of abstract art on both conceptual and spatial levels.

- Strengths: Students exhibited a strong performance in transferring fundamental design principles—form, color, balance, and depth—into three-dimensional compositions.
- Areas for Improvement: Certain models could be improved in terms of structural stability and material craftsmanship. Moreover, while some students intentionally diverged from the original artworks to introduce creative originality, such deviations occasionally led to a loss of conceptual essence.

These outcomes indicate that art is not merely an aesthetic expression, but also a spatial, structural, and conceptual experience. Through this process, students built new connections between art, architecture, design, and science, thereby enhancing their creative and critical thinking skills. This represents a modest yet meaningful contribution to contemporary art and design education.

Furthermore, the *"From Surface to Volume"* workshop offered students an experiential learning process that advanced their abilities in spatial perception, design thinking, the art–architecture relationship, and physical modeling. By transforming abstract artworks into three-dimensional models, students developed their creative problem-solving abilities, engaged in kinesthetic learning, and deepened their understanding of how artistic compositions can evolve into spatial constructs.

The workshop was positively received by participants, who appreciated it not only for its informative and skill-enhancing aspects but also for providing a stimulating, free, and creative learning environment. Students reported that such extracurricular activities increased their motivation to learn, encouraging them to pursue self-directed exploration and development rather than focusing solely on grades. This shift fosters a more personal, discovery-oriented, and sustainable learning process.

In conclusion, this study demonstrates how abstract art and physical modeling can be effectively integrated into architecture and design education, offering a significant interdisciplinary contribution. It also positions the *"From Surface to Volume"* workshop as an experiential learning approach that enhances student motivation, fosters creativity, and bridges the gap between artistic expression and spatial design thinking.

References

1. Bois, Y.-A. (1990). *Painting as model*. Cambridge, MA: MIT Press.
2. Chipp, H. B. (1968). *Theories of modern art: A source book by artists and critics*. Berkeley, CA: University of California Press.
3. Girgin, F. (2020). Sanatta diyalog: Resimden heykele. *Trakya Üniversitesi Sosyal Bilimler Dergisi, 22*(1), 515–530. https://doi.org/10.26468/trakyasobed.631044
4. Gombrich, E. H. (1992). *Sanatın öyküsü* (B. Cömert, Trans., 15th ed.). İstanbul, Türkiye: Remzi Kitabevi. (Original work published 1950)
5. Kandinsky, W. (1977). *Concerning the spiritual in art*. New York, NY: Dover Publications.
6. Kolb, D. A. (2015). *Experiential learning: Experience as the source of learning and development* (2nd ed.). Upper Saddle River, NJ: Pearson Education.
7. Malevich, K. (1959). *The non-objective world*. Chicago, IL: Paul Theobald.

8. Martin, D. F. (1981). *Sculpture and enlivened space*. aesthetics and history. Lexington, KY: University Press of Kentucky.
9. Miller, J., & College, W. W. (n.d.). *Space is place: Why the placement of sculpture matters*. Retrieved April 19, 2024, from file:///C:/Users/HP/Downloads/Space_is_Place_Why_the_Placement_of_Scul.pdf
10. Overy, P. (1991). *De Stijl*. London, UK: Thames & Hudson.
11. Özdamar, E. G. (2024). Developing three-dimensional spatial embodiment in architectural design education: Underwater experiences. *Sport, Education and Society*, 1–17. https://doi.org/10.1080/13573322.2024.2333967
12. Pallasmaa, J. (2005). *The eyes of the skin: Architecture and the senses* (2nd ed.). Chichester, UK: Wiley.
13. Panofsky, E. (1997). *Perspective as symbolic form*. New York, NY: Zone Books.
14. Poggi, C. (2012). Picasso's first constructed sculpture: A tale of two guitars. *The Art Bulletin, 94*(2), 274–298. https://doi.org/10.1080/00043079.2012.10786041
15. Read, H. (1956). *The art of sculpture*. London, UK: Faber and Faber.
16. Tate. (2025). *Abstract art*. Retrieved February 9, 2025, from https://www.tate.org.uk/art/art-terms/a/abstract-art
17. The birth of synthetic cubism: Picasso's guitars. (2011). Retrieved April 20, 2024, from https://www.thoughtco.com/synthetic-cubism-picassos-guitars-183425
18. Vance, R. D. (1995). Sculpture. *The British Journal of Aesthetics, 35*(3), 217–226. https://doi.org/10.1093/bjaesthetics/35.3.217
19. Veen, L. (2017). Piet Mondrian on the principles of Neo-Plasticism. *International Journal of Art and Art History, 5*(2), 1–12. https://doi.org/10.15640/ijaah.v5n2p1