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Unfolding the Rhythm: Transmediary Thinking in Design

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Abstract: This paper explores the intersection of sound and space in first-year design education through the "Unfolding the Rhythm" project. Sound is viewed as a dynamic force that shapes subjective experiences of time and space, creating invisible connections between people, objects, and places. The project captures sounds related to stories of escape from daily life, organising them into speculative spatial narratives using a digital audio workstation. These auditory tales are then translated into spatial notation drawings, which are further transformed into three-dimensional sound topographies within a predefined volume. This fluid void, representing non-hierarchical and open-ended layers of topography, becomes a component of the spatial narrative inspired by Jorge Luis Borges' "The Immortal." The story's spatial descriptions are intentionally omitted, with students detailing and reproducing these spaces in the void defined by subsequent sections. The singularity of each space influences the emergence of cross-sectional interactions that transform the collective topography of the story, creating a reversed process of space construction through cuts, sections. The resulting models, reflecting spatial intervals in "The Immortal," contribute to the evolution of transmediary spaces. This sectional thinking offers students a novel approach to the architectural design process. The workflow defined here involves cross-media transitions and imaginative gaps in translation that embrace diverse potential futures, non-linear cause-effect relationships, and organisational forms. As a result, the project considers temporal processes instead of static objects, topological formations instead of geometric operations, and new ways of thinking about materiality by seeking an immaterial approach to making space within auditory dimensions.

Keywords: First-year design education, Soundscape topography, Section, Translation, Design process

1.Introduction

Sound generates emergent, evolving, and relational spatialities. Depending on the listener and their experience, sound fills time and space subjectively, forging an invisible topography that connects people, objects, and places. This paper delves into the "Unfolding the Rhythm" project, which uncovers the interplay between space and sound in first-year design education held in Architectural Design Studio at MEF University in the fall term of the academic year of 2022-2023. The fall semester of 2022-2023 is structured around three projects: unfolding the room, unfolding the rhythm, and unfolding the wall, with project goals and outcomes aligned to an annual thematic focus (Figure 1).

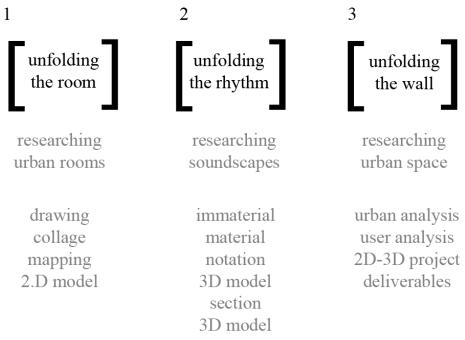

***Figure 1**: 2022-2023 fall semester Architectural Design Studio I projects and targeted outcomes. (Diagram by Irem Naz Kaya)*

Unfolding the Rhythm, the second project of the semester, aimed students to develop their individual and collective learning processes in design education through sectional thinking and material experiments.

It explores the material/immaterial and topographical encounters of soundscapes through stories of escape. The project, phase by phase, constructs these spaces through cross-media transitions and architectural operations that conceptualise sound as the atmospheric space-making element. Moreover, in parallel with the change of media, the series of instructions given do not remain as mere translations but re-creations carrying traces from previous tools and mediums with each iteration.

The project begins by capturing sounds and audio recordings of various events and objects related to stories of escape encountered in daily life. These sounds of escape stories constitute the beginning of the research that will turn into the bases of the escape places in The Immortal story (Borges, 2013), which will be reconstructed to create the narratives of escape in the second phase of the project. These escape narratives encompass various forms, redirecting the daily flow, and seeking refuge from undesirable places, and each one represents a spatial accumulation of the sounds individuals experienced in their daily lives or encountered along their journey. While escape narratives trigger the plotline and initiate an unknown journey, they also align with our approach to design pedagogy. Escape is defined in the Oxford Dictionary as "breaking free from confinement or control" (Oxford University Press). Crafting an escape story differs from a challenge in that it compels its author in a reverse sense, demanding a departure from conventional narrative constraints.

2.Methodology of the Project: Designing the Studio Instructions

Design studios are at the core of the curriculum at MEF University where students are active engagers-tellers and listeners. Telling and listening take the form of "reciprocal reflection-in-action" where students both design and learn to design through learning-by-doing (Schön, 1984). Recently, this learning-by-doing approach has evolved alongside new technologies and digital culture, indicated by Bob Sheil, promoting progressive education. These technologies empower students to expand their imaginations and apply knowledge across diverse disciplines, transforming them into "hybrid disciplinarians." This transformation encourages a critical approach to design and fabrication (Sheil, 2015). By engaging in production processes through technological experimentation and research, students bridge the gap between academic learning and practical application. This integration of educational discoveries with technological advancements provides new tools and opportunities for students to meet practical needs across various fields.

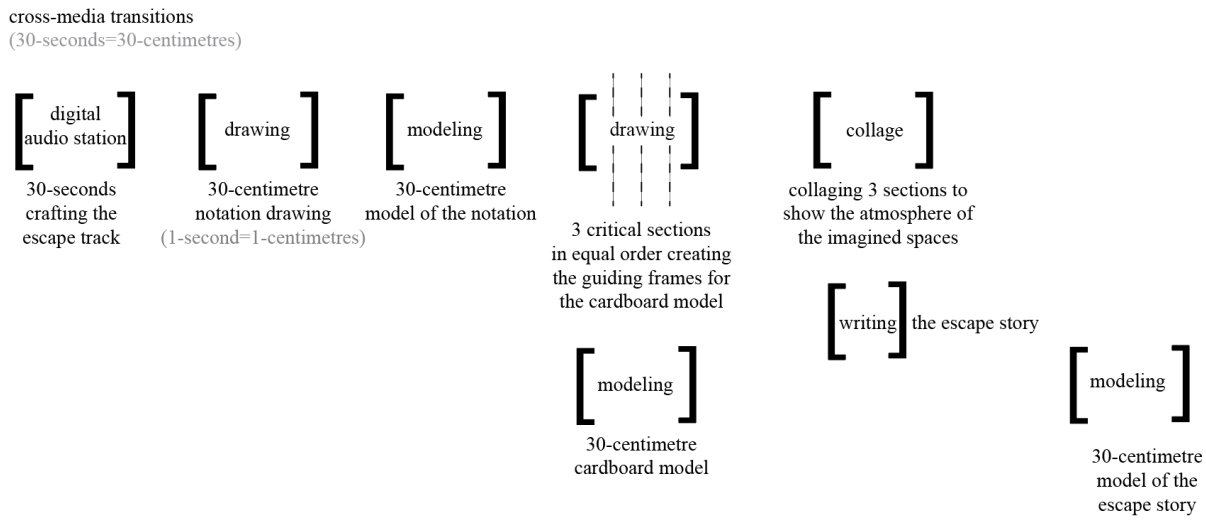

Figure 2: *Methodology of the studio: Series of instructions, designing the cross-media transitions. (Diagram by Irem Naz Kaya)*

This adaptation is curical as traditional educational goals and methods often fall short in supporting both learning and societal transformation (Froud & Harriss, 2015). Unlike conventional approaches where researchers pose questions and seek answers, design research frequently begins with generative processes (Rendell, 2021). Consequently, there has been a shift towards endorsing research that spans multiple disciplines and embraces interdisciplinary approaches. Interdisciplinary research challenges disciplinary boundaries by involving individuals from various fields, fostering innovative perspectives that critique established power structures and promote alternative knowledge frameworks (Rendell, 2021). In line with this shift, the Unfolding the Rhythm project explores interdisciplinary intersections of sound, literature, and architecture within a studio framework using transmediary representations. The investigation of transmedia transitions in architectural design processes within design studios represents a significant research area, as studio culture is characterized by dynamic, interconnected layers rather than static boundaries.

To date, various approaches have been explored regarding the interdisciplinary relationship between architecture and sound, particularly how the soundscape influences design education (Fowler, 2013). In *"Spaces Speak, Are You Listening?"*, Blesser and Salter highlight the concept of "the aural architect," who designs environments that evoke emotional and behavioural experiences of space, fostering social and cultural cohesion among occupants (Blesser & Salter, 2007). It is evident that sound initiates research that transcends boundaries in design education, enabling architectural practice to move towards atmospheric and multisensory design spaces. In this research, rather than solely defining space by its physical confines, attention shifts to intangible and experiential boundaries through a series of operations. Figure 2 outlines the overall phases, revealing these operations and instructions (recording, drawing, modeling, collaging, writing) aimed at creating new confrontations and encounters. Introducing mechanisms that do not confine students to predetermined paths, especially within first-year design education, helps avoid inherent deadlocks within the discipline itself. Moreover, encountering other disciplines such as sound while engaging with one's own discipline fosters more open-ended learning, eliminating control mechanisms for both students and instructors.

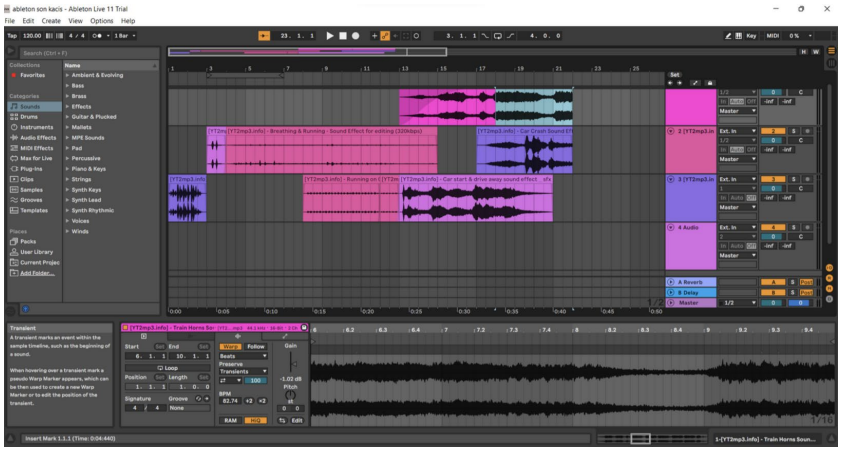

***Figure 3**: Student working on 30-second escape track in Ableton Source: (Ege Ringo) (Screenshot from Ege Ringo's Ableton interface)*

The workflow defined here involves cross-media transitions and imaginative gaps in translation that embrace diverse potential futures, non-linear cause-effect relationships, and different ways of organising the space. As Robin Evans points out, the transmission of ideas in architecture never occurs seamlessly; there is always a gap between drawing and construction, and the deviations caused by that gap. When translated from drawing to construction, it often serves a projection function (Evans, 1996). Moreover, according to the Stoics, the gap is an unlimited openness that enables objects and their qualities to remain in place while providing room for interactions among them and be seen as an immaterial condition that makes materialism possible. (Kousoulas 2022). As mentioned by Evans and Kousoulas, the gaps occurring between transitions across media in this project trigger creativity and imagination. Therefore, this gap or deviation is seen as a way of re-establishing new relationships, allowing for the inclusion of what deformed in the previous step by repairing it while keeping traces with each iteration. As a result, the project paves the way for considering temporal processes instead of static objects, topological formations instead of geometric operations, and new ways of thinking about materiality by seeking an immaterial approach to making space within auditory dimensions.

2.1. Designing the 2D and 3D Transitions

As mentioned in the previous section, this project takes off with an open-ended instructional series, which is a designed workflow for the studio process such as recording sounds, manipulating them by accelerating, slowing down, reversing, trimming, cropping, and thus "creating a musical composition derived from an escape story." Collected recordings are arranged and curated within a digital audio workstation (Ableton) to craft 30-second speculative spatial stories that transport the listener to imaginary territories. Ableton facilitated students' interaction with sound volumes by manipulating speed rates and applying clipping techniques, thereby addressing the temporal aspects of the designed auditory experience (Figure 3). Ableton was chosen not only for its user-friendly interface that allows easy sound modification but also for its ability to visualize the relationships between different sounds layer by layer. This capability helps establish the sound-visual connection and provides a background for the notation drawings that will later be required from the students.

By using concepts such as loop -*a repeating section of sound material*- (Wikipedia) and pitch -*the perceived quality of a sound that is chiefly a function of its fundamental frequency—the number of oscillations per second (called *Hertz, abbr. Hz) of the sounding object or of the particles of air excited*

***Figure 4**: Editing grid of Ableton showing the visual translation of sound*
Editing Grid of Ableton: cdm.link. (2023, November). *Ableton Live 12: Everything new*. Retrieved from https://cdm.link/2023/11/ableton-live-12-everything-new/

by it- (The Harvard Dictionary of Music, 2003), students started to construct their spatial stories. Later, the escape tracks are converted to spatial notation drawings which, according to Allen (2009), are subjective instructions transcending time and space, combining spatiality and materiality. The notation drawings serve as a transformative device, allowing the author to represent the intangible and establish a relational interface. This interface, in turn, creates soundscapes by translating auditory dimensions into visual drawings. Although Ableton illustrates the relationships between sounds through its editing grid, the visuals it presents are diagrams reflecting measurable, numerical values of sound, such as loudness and the active time intervals of instruments. These diagrams lack information about the emotion and mode of the sound, and therefore do not possess the subjectivity found in notation drawing (Figure 4).

Moreover, the process of notation drawing empowers students to initiate their design by

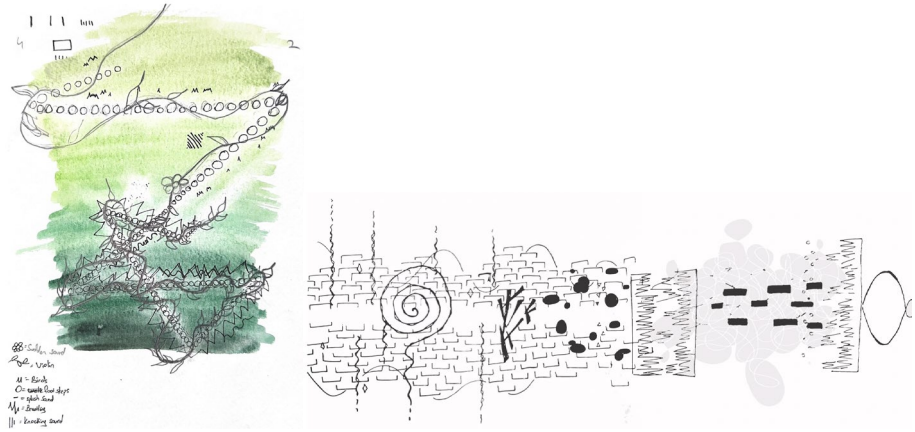

***Figure 5**: 30-centimeter notation drawings built second by second corresponding to 30-seconds of escape track. Drawing on the left: Escape from the forest, encountering the sounds of nature, space and time flows vertically in this story Source: (Yagmur Kirca); Drawing on the right: Escape from the keyboard sounds in the office, space and time expands at different rates and flows horizontally Source: (Nisan Tekin) (Drawing on the left by Yağmur Kırca, drawing on the right by Nisan Tekin)*

rendering an intangible layer visible. Notation drawings reveal a dynamic flow of time, adopting diverse directions and line weights as they encounter the musical realm. Within this flexibility, notation drawings play a crucial role, providing first-year students with precise information to guide them when navigating the unpredictable territories of design thinking. Simultaneously, students learn to distinguish abstract concepts, such as emotions, mood descriptions, or adjective clauses during this translation process and explore spatial configurations that indirectly generate these states and concepts (Figure 5).

Later, these two-dimensional notations are transformed into three-dimensional sound topographies within a predefined volume of 15 cm (width) - 15 cm (height) - 30 cm (length). The 30-centimetre length serves to capture the temporal flow of a 30-second track, while the width and height dimensions are employed to represent the qualities of sound such as intensity, depth, or volumetric resonance. The 3D-model study of the first phase plays an important role in comprehending, analysing, and reproducing the atmospheric continuity of the sound. The 3D model transforms the intangible spatial qualities of the sound into a topography. As Hill (2006) mentioned, “a sound can be as tangible as an object” since it generates its material and immaterial layers. In the next phase, the topography of sound is explored by contour lines which transform the immaterial qualities of sound topography to tangible contour lines. Eventually, as the number of contour lines increases to cover the whole atmospheric qualities of sound, the transition from intangible layers to tangible ones defines a derived topography from the original one. This phase of the project is critical as it questions the relationship that architecture establishes with materiality by defining architecture through immaterial conditions. The idea of creating space by transforming the immaterial into material is introduced in the Air Architecture Manifesto (1959). This manifesto envisions all transient materials becoming building materials; daylight, air and any gas heavier or denser than air, magnetism, sound, smells, magnetic forces, and electricity—all can be seen as a building material and considered equally with the material layers like brick and concrete to construct the space. Similarly, Moholy-Nagy argues that space can be understood as relations among different materials, offering a new perspective on the concept of material itself. He asserts that space lacks independent existence, quoting physics: "space is the relation between the position of bodies." However, he places greater importance on the relationships between spaces rather than the bodies themselves, stating that "space creation becomes the nexus of spatial entities, not building materials." Building materials are auxiliary and can only be used to create spatial relationships to a limited extent. Space itself is the primary tool for creation. Moholy-Nagy describes space as "this material" and emphasizes that "the phrase 'material is energy' will have significance for architecture by emphasizing relation, instead of mass." He contends that recognizing matter as energy shifts focus to space as a kinetic force-field of fluid relations and minimal substance, making space the material of immaterial architecture (Hill, 2006).

Describing architecture through the interplay of immaterial and material layers not only indicates a redefinition of space but also suggests a reconsideration of the design process, which is prompted in the studio process with sectional cuts.

2.2. Designing the Cuts

Some academics contend that there is an intriguing connection between architectural cross-sections and human dissections (Angelopoulou, 2017). For architects, plans and sections serve as tools that unveil the spatial layout, just as an x-ray exposes the internal organization of the human body (Zylinska, 2021). The introduction of cross-sections into the architect's toolkit marked a new era in how architectural objects are internally organized, establishing a dialectical relationship between surface and depth. In essence, architecture has historically involved intellectually "cutting through" buildings to give them material form, making "cutting through buildings" an essential part of the construction process. Architects use

cuts as a "generative enactment," in the words of Eva Hayward, and as a form of becoming—a way to "feel the growth of new margins" (Angelopoulou, 2017).

For instance, in his Arcades project, Benjamin explores how nineteenth- and twentieth-century apartments function as protective shells for their inhabitants, akin to compass casings or shells. However, this casing represents a threshold between interior and exterior spaces. While it appears to be purely protective, it is also displayed and projected outward, like items in a shop window or museum artifacts. The once quiet, secure, and intimate bourgeois interior has transformed into an exterior facade. Benjamin suggests that no matter where it is opened or cut, the house remains a facade, stating that “arcades are like houses or passages that have no exterior, like the dream” (Teyssot, 2005). Benjamin establishes a relationship between urban interiors created by arcades and the visibility provided by sectional cuts. The section transforms every public space into an interior with the layers it encompasses, such as sewer lines, water and gas supply, and metro tunnels, while revealing Victorian interiors as facades. According to Teyssot (2005), through the cut, these interiors become reversible surfaces, which can be transformed into exteriors. These cuts serve as a critical threshold in topology, delineating between the interior and exterior. Thus, Benjamin emphasizes the relationship of visibility that the cut establishes with windows that allow observation of the exterior. He uses the cut as a mode of revelation, asserting that ‘any form of observation depends on the act of making the cut’ (Barad, 2003).

Moreover, according to Hernan Barria Chateau, the cutting of a building to make an observation, did not remain a mere matter of intellect within architectural history (Chateau, 2011). In the 1970s, this concept moved from theory to reality when Gordon Matta-Clark famously dissected buildings, bringing the idea of building cuts into the physical realm. Matta-Clark transformed a suburban family house in New Jersey, set for demolition, into the sculpture "Splitting" (1974). Cutting from foundation to roof, he divided floors, walls, and stairs, flooding the interior with light and creating a dramatic architectural state that foretold its impending demolition. The Cutouts weave time, light, nature or the street into the abandoned building. By cutting into the architectural fabric, Matta-Clark was able to better comprehend it and demonstrate the cuts' ability to reorganize itself, resulting in intricate and unexpected spatial outcomes. He uses the cut to highlight its pervasive complexity and create novel perspectives by allowing immaterial layers to alter the understanding of the building, space. For Matta Clark the cut, or the incision which occurs in an existing structure or a design drawing, unveils the mystery of solid-void, encompassing both the known and the unknown. This incision not only reveals hidden layers but also provides an opportunity to imagine the undefined and design the unknown. Thus, the void that the incision unveils, transcends its Cartesian dimensions and represents a highly fluid field, encapsulating serial, non-hierarchical, and open-ended layers.

Moreover, the cut has a temporary dimension as it suspends in space, creating different temporary planes that imperceptibly stabilize and reconstruct a storyline. This capacity of the section to reconstruct is described as evolving and generative, as Debaise and Bergson discuss. According to Debaise (2012), the cut, or section, initially constructs a temporal plane that 'extracts from a part of an ongoing experience' and has the potential to evolve and incorporate beyond. Similarly, for Bergson, every section corresponds to regimes of individuation and relation, making it generative by continually attempting to reconstitute and transform through cutting or extracting, thus introducing a new situation. As Mark Wigley (2017) points out, Matta Clark's cut is a unifying operation that 'connects spaces around a line' rather than an action that separates or disperses.

Looking at the literature on this entire section, we employ the concept of the section and cut to generate ideas, shape matter into specific forms, and organize these forms into coherent wholes. Sectional cuts play a transitional role in the

process of the Unfolding the Rhythm project. Following the composition of the sound topographies, students draw three sections highlighting instances where the model exhibits the highest complexity. Progressing with sectional cuts carries traces from further examples where section and void relationships are examined. In the next phase, three sections are transferred onto cardboard and inverted; the positive space within the section drawings is cut out, revealing the negative space that corresponds to the voids in the sound topography. The spaces between the sequentially acquired sections are opened up, revealing a defined void where the fourth dimension can permeate.

2.3. Writing the Collective Narrative

We use the narrative of Jorge Luis Borges' story to create a new space between the sections. In this phase of the 'Unfolding the Rhythm' project, akin to Barad, we view the cut as a 'boundary-drawing practice' (2007). This perspective opens a dialogue for interdisciplinary thinking between literature and architecture. According to Lim (2013), literary theory and literature have significantly influenced architecture education in the past two decades. From Italo Calvino's Invisible Cities (1972) to Roland Barthes's 'The Death of the Author' (1968), writers and their works have inspired a generation of architects to use both real and imagined as creative springboards. CJ Lim's London Short Stories aims to push architecture to its limits by integrating fundamental elements of fiction. This research combines design and text, using narrative as its primary medium. It employs original materials inspired by literary symbolism to design and articulate urban spaces, blending theory with practical application in a unique approach.

Text is often underutilized in architectural design, typically serving an explanatory rather than expressive role. However, in this project, text is innovatively employed as a creative tool, shaping narratives that transform two-dimensional sheets of paper into intricate, sometimes surreal stories. Each narrative begins as a flat surface and evolves through cutting, inscription, folding, and fusion into multidimensional tales. Text and collage, or text and photographs thereof, interact in complex ways—sometimes aligning, sometimes diverging—to explore various facets of the story's potential meanings and interpretations (Figure 6).

Figure 6: *A page from CJ Lim Short Stories.*
(CJ Lim Short Stories.Domus. (2011, November 6). Short stories: London in two and a half dimensions. Domus. Retrieved from https://www.domusweb.it/en/reviews/2011/11/06/short-stories-london-in-two-and-a-half-dimensions.html)

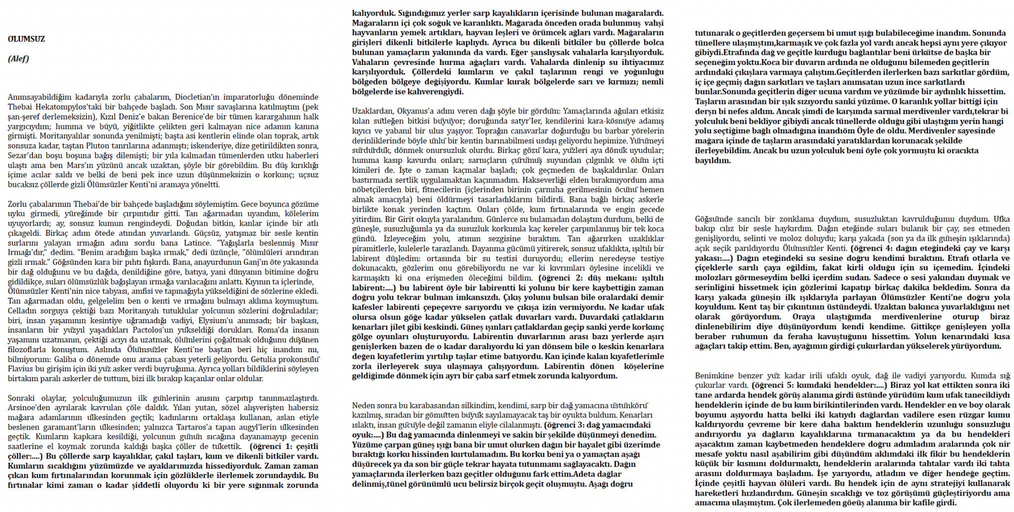

Figure 7: *Each student describes the spaces in the Immortal story in detail and the story is written collectively by 12 students. Bold texts refer to students' descriptions of their imagined spaces. (Collective story, by Emine Hatun Aktaş, Emre Koçar, Gözde Defne Kocaman, Sumru Yaren Cav)*

Similarly, like CJ Lim, we use Jorge Luis Borges' short story 'The Immortal' to explore new spatialities, considering changes in spatial practice that could be truly transformative. Before distributing the story for students to study, the spatial descriptions in the story are intentionally omitted, and its paragraphs depict different spatial configurations such as "the cave", "the village", "the desert", "the labyrinth" etc. in the storyline. The spatial descriptions are one by one distributed in the studio. Each student describes these spaces by writing a spatial narrative in detail and reproduces them in the void defined by three subsequent cardboard sections placed in equal order (Figure 7).

The arrayed sections create the guiding frame in which the spatial narrative will be constructed by a physical model. This model materialises the narrative and builds a precisely scaled topography that refers to a subsequent spatial interval in the modified "The Immortal" story. Additionally, the singularity of each space contributes to the evolution of another space sequentially. This, in turn, facilitates the emergence of cross-sectional interactions and transformations between spaces. Thus, the process of constructing one space is inverted into another space, revealed through an architectural operation (section), allowing sectional thinking to guide in exploring a new approach to designing the space.

Sections that establish neighborly relations assist students in collectively shaping the atmosphere, interactions, and transitions. "The atmosphere of the space, verbally described in the narrative, encompasses layers of life, material, and immaterial characteristics within each section. This atmosphere is crafted not only through modeling, hand drawing, and collage but also through the integration of these representations, capturing the entirety of the space's atmosphere. Different episodes within the selected story are spatialized through the Doppler effect, as discussed by Somol and Whiting (2002), creating an atmospheric space that relates not only to each other but also extends beyond the program it initially presents. According to Somol and Whiting, the concept of interdisciplinarity in architecture seeks to validate architecture through external measures, potentially reducing it to a mere absorber of diverse life influences. Projective architecture, however, redefines architectural identity based on design and its impacts rather than traditional material and procedural norms. Doppler shifts

***Figure 8**: The spaces in the storyline of the Immortal story are designed and modeled side by side by the students within the cardboard sections. (Collage by Irem Naz Kaya)*

the notion of disciplinary autonomy towards a practice-oriented view where disciplines are dynamic and continually evolving. Doppler emphasizes architecture's diverse multiplicities—materiality, programming, atmosphere, and technology—highlighting how these complexities differ significantly from approaches in other disciplines. This approach focuses not just on object qualities but also on sensory and experiential dimensions.

Considering the Doppler effect, the space crafted by 12 students placed side by side, created using sections from both the previous and the next, reveals the entire escape story. Each space holds equal significance in this story and is arranged without hierarchy. In this collaborative process, each student designs a spatial interval contributing to a larger whole beyond their individual action radius (Figure 8). Even though it requires a certain level of collective work with their 'neighbours'; the hidden agenda of this work depends on an altered collectivity based on multiplicity of individual explorations in the studio setting.

As the students encounter a design problem that requires translation from abstract narratives to tangible ones, they observe 11 other ways of coping with this complex situation that will later come together and form a whole. This observation enables them to invent and settle in their own individual ways of designing in a supportive environment.

Our design pedagogy shows similarities with the concept of the section previously mentioned, which was described as temporal and generative. Similar to the section, our series of instructions generate temporal frameworks for students, allowing them to reinterpret and overcome challenges at each phase they

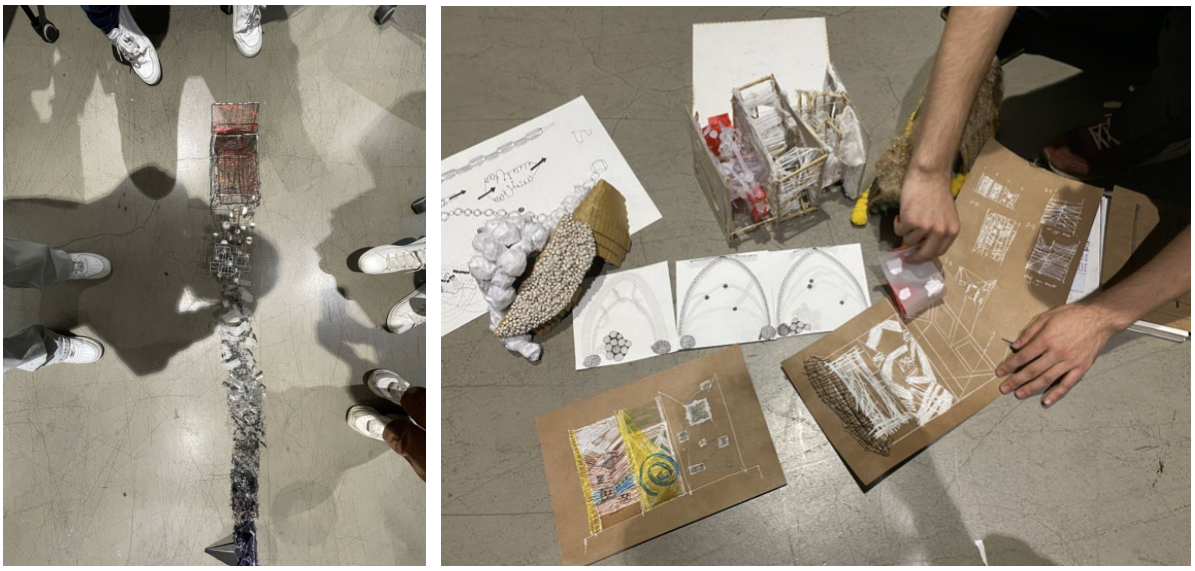

***Figure 9**: Photographs from the studio. Collectively crafted models on the left; Student (Ali Haydar Ararut) work consisting of material research describing the atmosphere of the place in different sections on the right. Source: (Irem Korkmaz)*

***Figure 10**: Student work showing all phases of the project (Notation drawing on the top; models on the left; sectional drawings on the right) Source: (Dilara Koybasi)* (*Drawings and model by Dilara Koybasi)*

cooperate with. Reinterpretation and distortion in each phase are crucial to the overall process of this project and serve as a motivating approach for students at the beginning of their educational journey. Figure 9 illustrates the final works of a student, from notation drawings to the representation of the spatial interval.

3.Conclusions and Critical Reflections

Although starting design practice in unconventional ways was a positive side of the "Unfolding The Rhythm" project, understanding the relationship between sound and space was quite challenging for the first-year design studio. Consequently, contemplating the testing of the project for more advanced stages became a topic for consideration in future studies. Reflecting on experiences in the first phases of the project, we found the introduction of a non-architecture design discipline and actively transitioning between multiple disciplines to be very enriching in the process. Since students were unable to predict the next step in the project brief and could not rely on their previous strengths, they delved into more authentic investigations. The student's command of design tools from another discipline at various levels enabled them to gain a critical distance towards their design process. On the other hand, starting speculation on the space from

notations, resulted in more spatial qualities as stated from the unthought.

"Unfolding the Rhythm" contributes to future studio approaches focusing on the design process and iterations rather than the final product. This approach helps students engage continuously without singling any out, fostering collaboration on common ground. Recognizing each narrative as an escape story underscores viewing unknown situations not merely as outcomes of human actions but as integral parts of life. This perspective necessitates establishing interdisciplinary connections and design workflows, facilitating the emergence of hidden voices and transforming immaterial inputs into tangible outcomes. For Doucet and Janssens (2011) this approach emphasizes transcending traditional disciplinary boundaries and organizes knowledge around complex and heterogeneous domains rather than disciplines and subjects, resulting in knowledge that surpasses the sum of its disciplinary components. For us, this transforms design research into an interdisciplinary and generative process, diverging from conventional approaches where researchers pose questions and seek direct answers. It promotes the power of experimentation and research at each phase of the project.

In conclusion, the "Unfolding the Rhythm" project sought a reflective and innovative shift in the traditional design process through its exploration of the interplay between space and sound in first-year design education. By initiating architectural thinking from the material and immaterial dimensions of soundscapes, the project aimed to transcend conventional disciplinary boundaries, introducing students to cross-media transitions and imaginative gaps in translation. The emphasis on sectional cuts as a transitional tool aimed to challenge the established norms of architectural materiality, prompting a reevaluation of the relationship between immaterial conditions and the physical realm. Even though the decision to embark on unconventional design practices, while enriching, posed challenges in comprehending the relationship between sound and space for first-year design students, the project's evolution, as seen in its iterations and adaptations, reflects a commitment to continuous learning and improvement.

"Unfolding the Rhythm" has been a transformative exploration, challenging the boundaries of disciplines by questioning the possibility of material and sectional translations through narrative. As we reflect on these experiences, the project emerges as an advocate for a shift in perspective, urging us to view design as a dynamic process rather than a static outcome. This shift in thinking may not only enrich design pedagogy but also empower students with the ability to navigate the complexities of design thinking, thereby enduringly expanding investigation.

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