

TRANSLATING AUDITORY STIMULI INTO FORM: A METHODOLOGICAL APPROACH TO TEACHING FORM GENERATION

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ABSTRACT

How designers conceptualise and translate forms is deeply personal, often influenced by their creative abilities, educational training, and experiences. While companies expect designers to generate multiple form alternatives of comparable quality, teaching this skill presents unique challenges, especially in a design environment increasingly dominated by digital randomness.

When novice students are tasked with translating abstract concepts into tangible forms, their initial outputs often reflect a limited understanding of form articulation, relying heavily on conventional or literal interpretations. This assignment bridges the gap by introducing a pedagogical approach that uses music as an intangible source of inspiration. By drawing from two contrasting music pieces (e.g., classical and rock, meditative and metallic etc.), students are encouraged to explore the emotive, rhythmic, and structural patterns of sound. They translate these auditory stimuli into visual compositions, progressing from two-dimensional sketches to three-dimensional volumetric forms.

This pedagogical approach emphasises the importance of exploring expression and intangible inspirations to create forms that are exclusive and contextually rich. The step-by-step process trains students to articulate differences in forms inspired by distinct auditory experiences while simultaneously broadening their design perspectives. The result is an expanded repertoire of form alternatives, showcasing variations in style and identity. Through this exercise, students develop an understanding of how abstract influences can drive a unique form language, equipping them with critical tools for professional practice.

Keywords: Form exploration, tangible abstraction, sound and form, design education

1 INTRODUCTION

Teaching abstract form generation in product design education presents unique challenges and opportunities. At the IDC School of Design, IIT Bombay, the "Studies in Form" course is a core part of the Master of Design (MDes) curriculum for Industrial Design. This course aims to help students understand form generation by exploring key design principles such as composition, balance, surface flow, rhythm, dominance, and abstraction through structured assignments. However, teaching abstract form—especially without a direct functional or product context—can be difficult, often impacting student engagement, comprehension, and retention.

Abstract form generation differs from traditional design projects, where function typically informs form. Instead, students must adopt a more conceptual and expressive approach, interpreting intangible influences and translating them into tangible forms. Effective teaching strategies to address these challenges include direct instruction, scaffolding, and experiential learning, which help bridge the gap between theoretical concepts and practical application.

Stearnsio [1] highlights how abstract sculpture can evoke emotions and stimulate curiosity through unconventional forms and designs. She emphasises the value of drawing inspiration from diverse sources such as nature, daily experiences, and cultural contexts. Stearnsio also stresses the importance of experimentation and iteration in developing a deeper understanding of form.

A critical aspect of teaching abstract form is encouraging creativity and risk-taking. Many students start with preconceived notions about design, leading to hesitation when exploring unconventional forms. Misconceptions, such as the idea that abstract art lacks skill or meaning, can hinder learning. Addressing these misunderstandings is essential for helping students appreciate abstract form and effectively

articulate their artistic intentions as expressed in EMP Art [2]. A study at the Education Faculty of Universitat de Vic in Catalonia, Spain, identified common obstacles students face, including emotional reluctance to engage creatively, dependence on teacher guidance, time management challenges, and the influence of personal backgrounds on creative expression.

Corremans [3] noted the scarcity of research on methodological approaches to form generation. He argued that a well-defined methodology could help students produce a broader range of form alternatives and enhance their creative output. Building on this idea, this research paper proposes a pedagogical approach that uses music as a non-physical, emotive stimulus for teaching abstract form generation. By integrating auditory inspiration into the design process, the study aims to provide a methodology that encourages creativity, promotes abstract thinking, and broadens students' design perspectives. Ultimately, this research seeks to contribute to more effective teaching methods that help students articulate abstract ideas and develop innovative design solutions.

2 METHOD

The course began with foundational exercises inspired by Rowena Reed's work illustrated by Hannah [4] to build a design vocabulary, focusing on concepts such as dominant, subdominant, and subordinate forms, as well as foreground and background. Bošnjak [5] emphasises hands-on activities included exploring form transition and radii manipulation to understand surface flow, transitions, and how changing radii / chamfer can alter form's character, which is also supported by Corremans [3].

To deepen students' understanding of emotive forms, expressions, critical thinking, and design articulation, a new assignment was introduced using music as an abstract stimulus for form generation. This qualitative research approach aimed to bridge the expressive elements of music—such as rhythm, harmony, mood and dynamics—with the tactile and spatial qualities of sculpture. The goal was to help students communicate artistic ideas through physical form, enhancing their creative and analytical skills.

2.1 Data Collection and reflection

Observational Data: Notes were taken throughout the exercise to capture student engagement, interpretation methods, and challenges encountered.

Student Outputs: The sketches and final 3D models were analysed for creativity, diversity of interpretation, and alignment with the sound stimuli.

Reflections and Feedback: Qualitative feedback from students and faculty was gathered through discussions and reflective statements to assess the effectiveness of the pedagogical approach.

The study was conducted with 16 first-semester postgraduate students from the Industrial Design programme at the IDC School of Design, IIT Bombay. The methodology integrated experiential learning, iterative design processes, and reflective practice, structured around a six-step exercise:

- Step 1: Select two music pieces, preferably from contrasting genres, and immerse oneself in them through repeated listening.
- Step 2: While listening, derive expressive keywords that capture the music's essence and begin sketching in response.
- Step 3: Engage in iterative ideation by producing multiple sketch variations and exploring combinations of ideas.
- Step 4: Translate selected 2D sketches into 3D forms, considering both material choices and form development.
- Step 5: Apply textures deliberately to enhance the conceptual meaning of the resulting form.
- Step 6: Clearly articulate the rationale behind each design decision.

Each of these steps is elaborated in the following sections, illustrated through examples from one student's project.

2.2 Sound selection and articulation

Objective: To introduce contrasting auditory experiences that inspire diverse and opposing visual expressions.

Process: Each student selected two musical pieces with contrasting characteristics (e.g., classical vs. rock, meditative vs. metallic). They listened to the music multiple times to describe how they perceive the music in terms of movement, emotions, tension and energy.

Rationale: By choosing music with distinct emotive and structural qualities, students were encouraged to explore and express contrasting visual forms.

Example: Student selected a part of the song: GLOBAL GEAR by artist: Punya Srinivas
 In Genre: Classical Carnatic Fusion
 Figure 1 shows the interpretation by the student and chosen keywords.

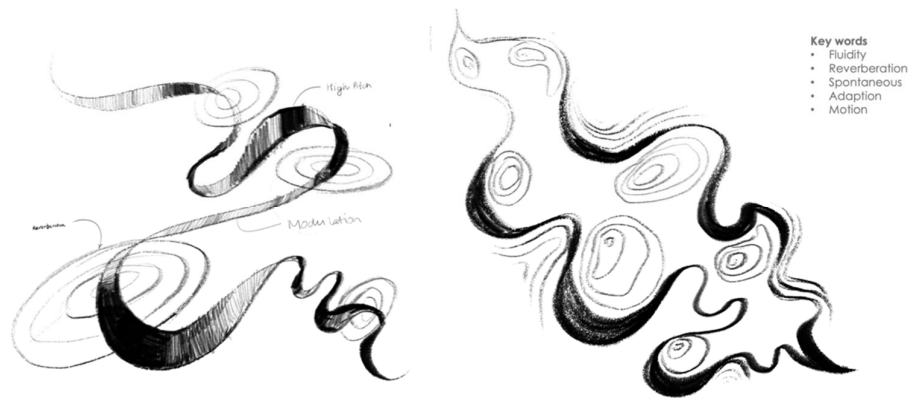


Figure 1. Student's interpretation of selected musical pieces with keywords as fluidity, reverberation, spontaneous, adaption and motion

2.3 Interpretation through Sketching

Immersion and Listening: Students repeatedly listened to their selected music to grasp its emotive, rhythmic, and structural nuances.

Articulation and Visualisation: Students translated their auditory experiences into abstract sketches, using lines, shapes, and textures (example: sharp sounds - as angular lines; soft beats - as bubbles; smooth legato flow - as organic continuous curves). The sketching process was iterative, allowing multiple attempts before arriving at a final form that resonated with the sound inspiration (Figure2).

Subjectivity and Expression: The exercise promoted open-ended exploration, with no 'right' or 'wrong' interpretations. Students shared their sketches and musical choices in class, fostering discussions that celebrated the diversity of perspectives.

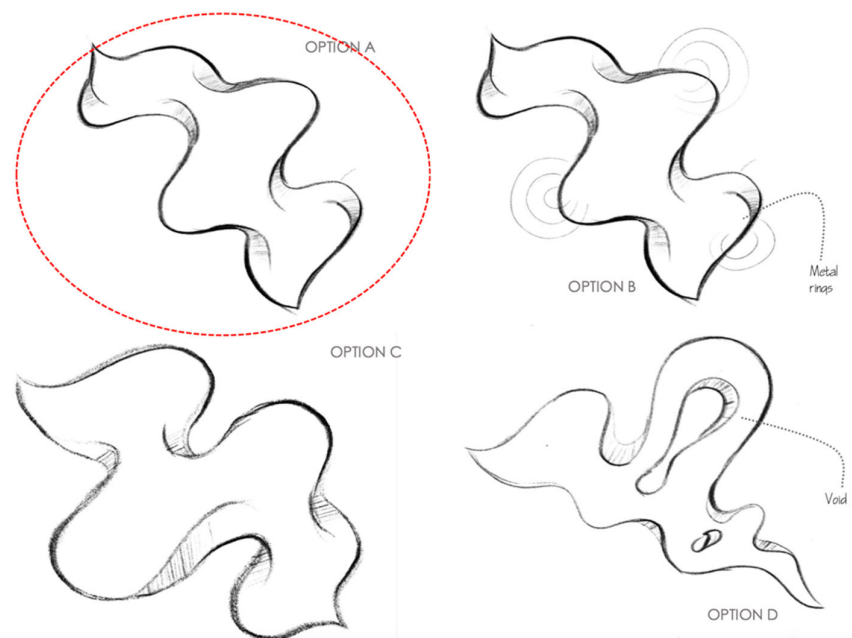


Figure 2. Multiple sketches of student to convert the sound into visual elements

2.4 Three-dimensional Form Creation

Material Selection: Initial explorations were done using sketching (Figure 3) and Styrofoam and clay for quick visualisation and iterative experimentation. Refined final forms were crafted using clay and Plaster of Paris (PoP) (Figure 4).

Form Development: Students transformed their 2D sketches into 3D forms using traditional sculpting techniques. They focused on translating auditory elements into physical qualities, exploring how aspects of music like emotion, rhythm, and structure could manifest in visual and tactile forms using surface flow.

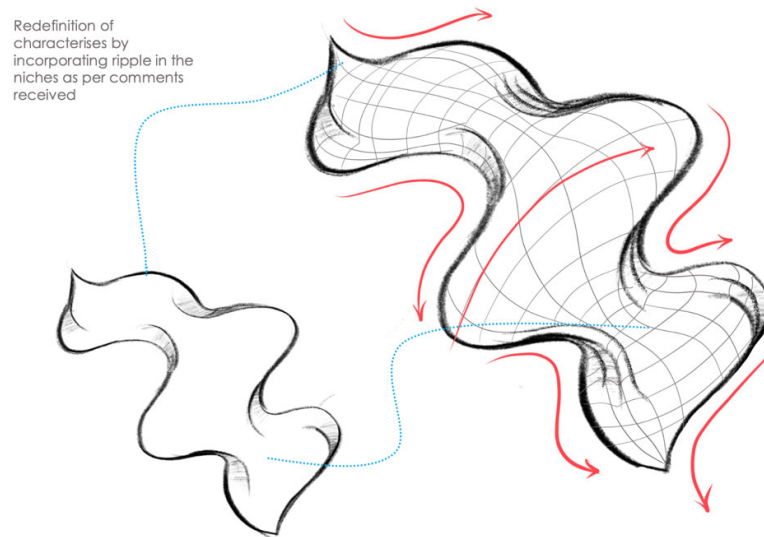


Figure 3. Conversion of 2D sketch in 3D form by student defining the direction of flow



Figure 4. Quick 3D exploration with Styrofoam coated with clay (left) and final form (right)

Articulation of Design Decisions: Students were encouraged to articulate how musical elements influenced their design (Figure 5). They reflected on how sound impacted form's gesture, movement, tension, calmness, and how design principles like rhythm, balance, hierarchy, and stability were applied through masses, voids, and elements.

The sound piece is from a classical Carnatic and indie-pop fusion soundtrack by Punya Srinivas. The soundtrack is a symphony of the Indian classical Veena, piano, drums, and other minor sound instruments.

The selected piece of all the soundtrack is a phenomenal note of reverberation and sound modulations. The slender start advances further into the wide transmission of the symphony. The waves run parallel with blur reverberations created towards the peak of sound waves.

Amidst the waves spread and form a high chord and again taper toward the end of the piece. The unpredictability of the frequencies and even modulations keep it sound intact yet resonating in ambience. Towards the end, the music is just roundabout but creates a high pitch of punk and taper till it gets blurred. The minor vocal notes in middle made it more humane.

Figure 5. Articulation of the design by the student

Presentation and Reflection: Students played their selected musical piece and presented their final sculptures, discussing their creative process and the connection between auditory inspiration and visual form. Peer and faculty feedback sessions facilitated critical reflection and refinement of form.

Overall, this methodology aimed to provide a structured yet flexible framework that nurtured creativity, encouraged abstract thinking, and enhanced students' ability to articulate and execute design ideas effectively.

3 DISCUSSIONS

In design education, particularly in form generation, students are trained to use visual stimuli. Visual learning occurs both consciously and unconsciously, through environmental exposure and classroom assignments. Tactile stimuli are always involved in form generation process. However, auditory and olfactory stimuli are rarely used, as they are inherently abstract and often go unnoticed when introduced. Through this assignment, we observed that these less-explored sensory inputs encourage students to push boundaries and step into unfamiliar territories that expand their design vocabulary and develop a deeper understanding of form as a medium of expression. Initially, students showed apprehension toward this approach, which led us to break down the assignment into smaller, manageable steps. Through a step-by-step explanation, continuous discussions, and an emphasis on articulating design decisions, these students gradually overcame their hesitations. This approach aligns with Katrina's [6] insights on the importance of personalised learning strategies in design education. The exercise facilitated creative exploration beyond literal interpretations, promoting a broader spectrum of influences in their design process. Through iterative sketching and form-making, students also developed a refined understanding of design principles, including flow, proportion, balance, rhythm, and the use of overlapping elements. This deeper appreciation contributed to more sophisticated and cohesive design outcomes, reinforcing critical design concepts.

It is observed that most of the students' form outcomes were organic in nature, with geometric forms being generated only rarely. Interestingly, the forms created often resonated with the music when interpreted in the context of the genre. This raises the question: Is music generally perceived as an organic entity? Discussions with the students revealed that music possesses a time dimension, which makes it feel progressive and organic in its nature.

Overall, the findings highlight the effectiveness of incorporating abstract stimuli into design education. The pedagogical approach encouraged students to explore abstract ideas, articulate their design processes, and create creative and contextually rich form alternatives. These insights contribute to the broader discourse on design education, advocating for experimental and experiential learning methodologies to foster design innovation and critical thinking.

4 CONCLUSIONS

This study introduced a novel pedagogical approach to teaching abstract form generation in product design education by using music as an abstract, non-physical stimulus. The methodology helped students overcome hesitations, engage with non-tangible inspirations, and articulate design decisions even in the absence of a functional product context.

Many students enter the course with preconceived notions of what product design should be, often influenced by traditional design paradigms and practical constraints. This mindset creates a barrier to

embrace abstract approaches, highlighting the need for pedagogical strategies that encourage open-mindedness and creative risk-taking.

This approach demonstrates the value of incorporating abstract and experiential learning strategies into design education. By using music to inspire form-making, educators can foster creativity, critical thinking, and a deeper appreciation of form as a medium of expression. Future research could explore the long-term impact of this methodology on students' design practices.

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