

Research Directions:
Biotechnology Design
www.cambridge.org/btd

Conceptual Tools for

Community Paper

Keywords:

BIODESIGN
BIOMATERIALS
DESIGN PEDAGOGY
LATERAL THINKING
DESIGN EDUCATION

Corresponding author:
Name; Email:
Devon Ward,
Devon.Ward@Auburn.edu

Teaching Biodesign: The Biodesign Matrix, The Conversational Approach to Design and Material Grammars

Devon Ward

¹Auburn University

Submission Type (Delete as Appropriate)
Paper

Extended Abstract (300-500 words)

As a field, biodesign has diverse aims, materials, processes, and outcomes. This offers potential for novel design solutions, but it can also make it difficult to introduce to undergraduate design students because there are so many aspects to cover in one course. This paper presents three conceptual tools—the *Biodesign Matrix*, the *Conversational Approach to Design*, and *Material Grammars*—that aim to reduce the learning curve when students engage in biodesign practices. First, the *Biodesign Matrix* is an analytic tool that can help students understand how past biodesign precedents function in society. It broadly categorizes biodesign projects based on two criteria: the design aims (i.e., discursive or utilitarian) and the design outcomes (i.e., conceptual outcomes, which rely on diagrams, video and interactive media, or material outcomes, which use living organisms or organic material). The second conceptual tool, the *Conversational Approach to Design* focuses on the design process. It emphasizes an inquisitive and process-based approach to design instead of a product-based approach. The final conceptual tool, *Material Grammars*, deals with the affective experiences that a user may feel when they encounter a biodesign project. The terms that make up *Material Grammars* are framed as oppositions (e.g., organic/synthetic, pliable/brittle, ephemeral/enduring) and can help students understand how the intrinsic qualities of a material can be transformed to create poetic and emotive experiences. Together, these three conceptual tools help provide clear, descriptive, and value-neutral terminology that can facilitate faster knowledge acquisition when students engage in biodesign practices.



Research
Directions





Figure 1. The Biodesign Matrix. (Image credits: Devon Ward).

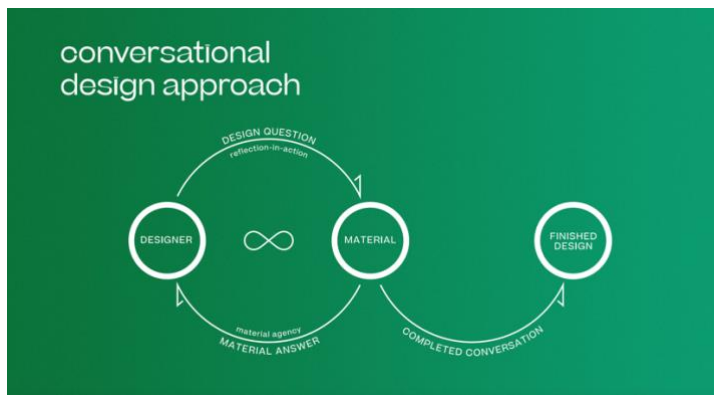


Figure 2. Conceptual Model for the Conversational Approach to Design. (Image credits: Devon Ward).

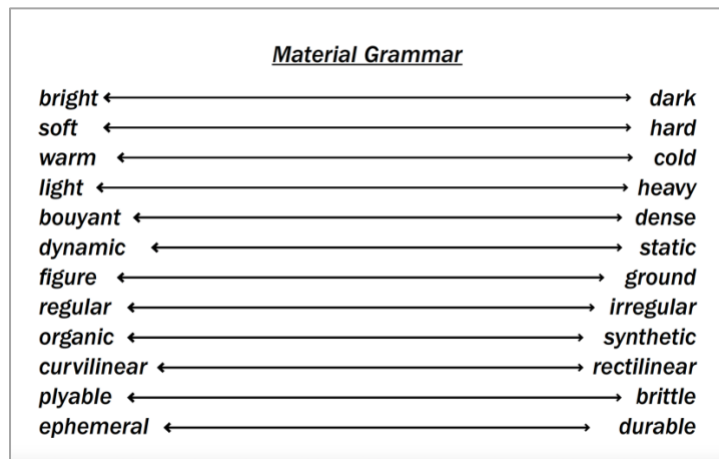


Figure 3. Material Grammars. (Image credits: Devon Ward).

Connections references

Vijayakumar V, Cogdell C, Correa I, et al. How do we grow a Biodesigner?
Research Directions: Biotechnology Design. Published online 2024:1-4.
<https://doi.org/10.1017/btd.2024.1>

References

- Malpass M (2019) Critical Design in Context. *Bloomsbury Visual Arts*.
- Schön D (1983) The Reflective Practitioner: How Professionals Think in Action. *Basic Books*.
- Tharp B, Tharp S (2019) Discursive Design: Critical, Speculative, and Alternative Things. *MIT Press*.
- Zumthor P (2006) Atmospheres: Architectural Environments. Surrounding Objects. *Birkhäuser Architecture*.