



Re-Designing the Hand Trowel

McKenzie Chase
Design Principles ID-2464-02

User Persona:



Age: 67

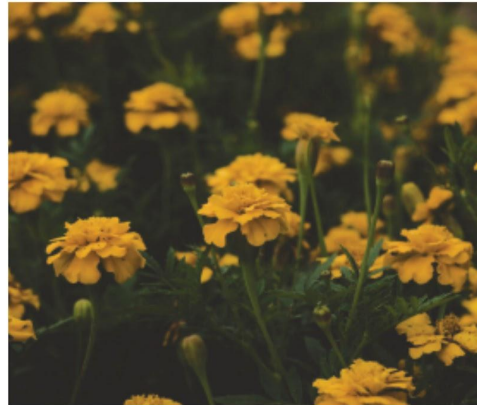
Job: Retired School Teacher

Status: Married

Location: Providence, RI

Maria Gomez, 67, is a retired elementary school teacher who dedicated over 35 years to shaping young minds. Despite living with rheumatoid arthritis, which confines her to a wheelchair, Maria has embraced her love of gardening as a way to stay active and creative. Her backyard is a testament to her ingenuity and determination, featuring raised cedar planters brimming with marigolds, tomatoes, and lavender. She's particularly proud of her butterfly garden, designed to attract pollinators and bring bursts of color to her outdoor space.

Maria is also an avid journaler, documenting the changing seasons in her garden and the stories of her life. Known for her warm smile and ready laugh, she's become a cherished mentor to her neighbors, hosting small workshops on adaptive gardening



Hand Impact: Maria suffers from rheumatoid arthritis, which causes swelling and stiffness in her hands. This makes it difficult for her to grip and use traditional gardening tools.

Mobility Impact: She also experiences pain and limited mobility in her knees and hips, making it hard to move around her garden or stay in one position for too long.



Tool Analysis



A hand trowel is a small, handheld gardening tool with a pointed, flat blade and a short handle. It's primarily used for digging, planting, and cultivating soil in small areas.



MATERIAL

Trowels can be made from stainless steel, carbon steel, or plastic. Stainless steel is durable and resistant to rust, while carbon steel is strong but may require more maintenance.

USES

Planting: Digging holes for bulbs, seeds, or seedlings.

Transplanting: Moving plants from one location to another.

Weeding: Removing weeds and their roots from soil.

Cultivating: Aerating and loosening soil around plants.

Mixing Soil: Incorporating compost or fertilizers into the soil.

Edge Trimming: Defining borders of flower beds or garden paths.

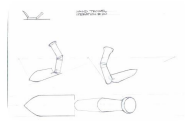
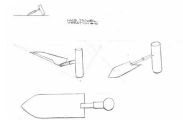
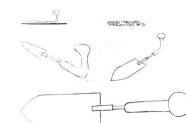
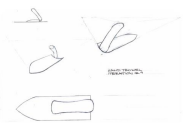
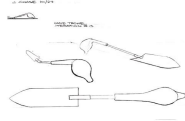
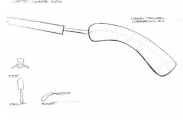
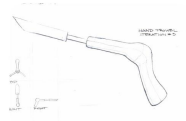
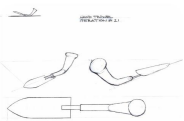
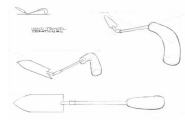
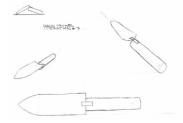
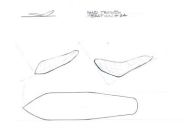
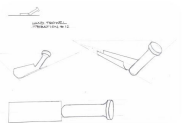
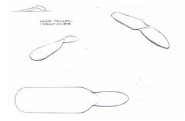
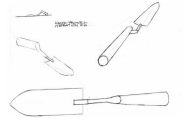
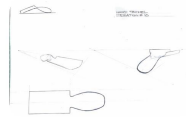
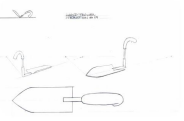
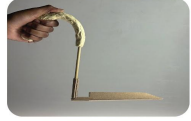
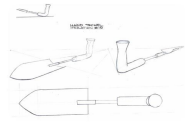
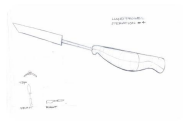
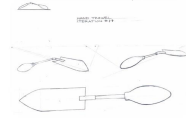
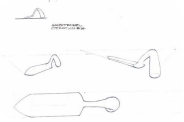
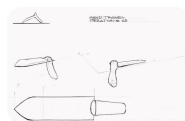
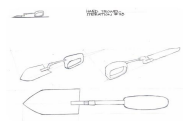
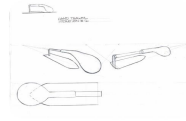
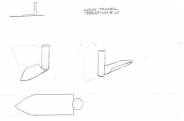
Soil Testing: Collecting samples for moisture or pH testing.

Mulching: Spreading mulch around plants.

Harvesting: Gathering small root vegetables or herbs.



25 Low Fidelity Iterative Models & Sketches



5 Medium Fidelity Models

MODEL 1



MODEL 2



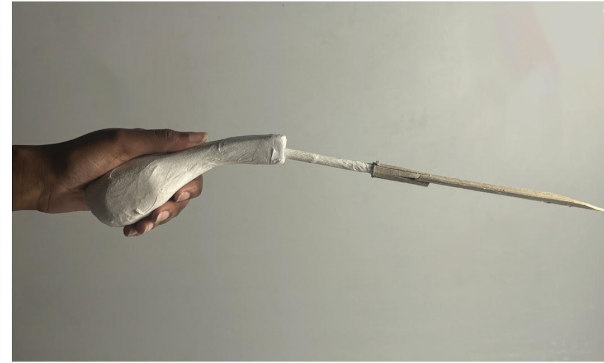
MODEL 3



MODEL 4



MODEL 5

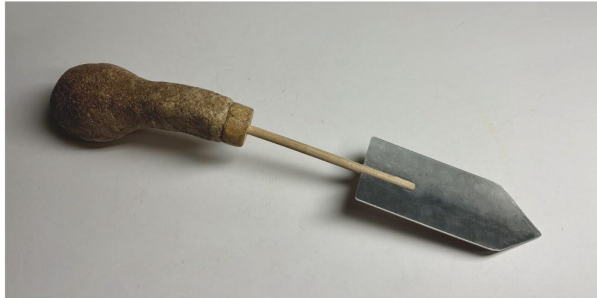


My 5th medium fidelity model was the model I decided to elaborate on as it was most positively received by the figure models.



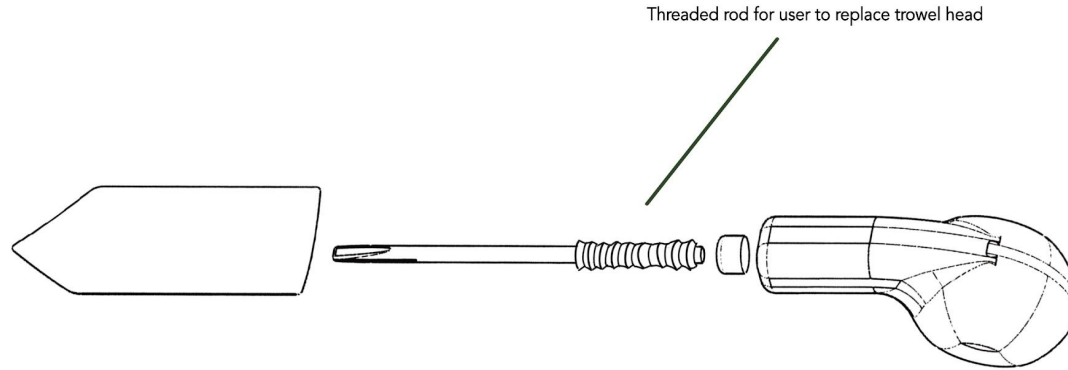
Sitting with figure models as they explain which poses feel comfortable and which are difficult or painful, offering valuable insights. This feedback helped me refine my approach, ensuring that my work prioritizes accessibility and comfort.

Final Model

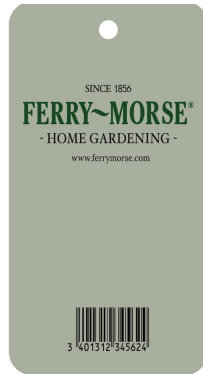


Pictured to the right is my final form model of the hand trowel. The handle is crafted out of paper clay; a mixture of paper, sawdust, vinyl spackle, and wood glue. The tang is made from a wooden dowel and the head is cut and filed from a sheet of aluminum.

Exploded View



Color, Material, Finish Board



Environmental Diagram



Self-Reflection



Working on this redesign was both challenging and rewarding. The primary difficulty was balancing functionality with ergonomics—ensuring the design was easy to use without compromising durability or usability for individuals with limited grip strength. I learned the importance of user-centered design and testing, as direct feedback from potential users helped me refine my approach. Through this process, I deepened my understanding of material selection, weight distribution, and how small design changes can significantly impact user comfort. This project reinforced the value of empathy and adaptability in design, which I will carry forward in future work.