TattooDoodler
DOCUMENTATION

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1 NEEDFIND

NEEDFINDING

We conducted 4 needfinding interviews with a mix of tattoo artists and clients, with the following prompts guiding the conversation in each interview.

Artists

1. What is a story of a time where placing a design was particularly difficult or stood out?
2. Are there recurring challenges you face in designing tattoos for a particular body part?
3. What software or analog tools you currently use to ensure your designs fit well on clients?
4. Based on our tool proposal, what contexts/situations would Tattoo Doodler be useful in?

Clients

1. What is a story of a time where placing your design was particularly difficult or stood out?
2. What resources did you use to select design and placement?
3. Have you ever tried to depict placement of a tattoo before getting it and how did you do that?
4. Based on our tool proposal, what contexts/situations would Tattoo Doodler be useful in?

FINDINGS & DESIGN GOALS

Synthesis of the four needfinding interviews yielded two key issues that both artists and clients faced:

1. Difficulty translating flat drawings onto the human body led to unclear expectations for both artists and clients.
2. Limited ability to experiment with tattoo attributes (size, orientation, placement) hindered decision-making.

We directly translated these findings into two foundational design goals for the development of Tattoo Doodler:

DESIGN GOAL 1

Enable real-time 3D visualization of tattoo placement.

DESIGN GOAL 2

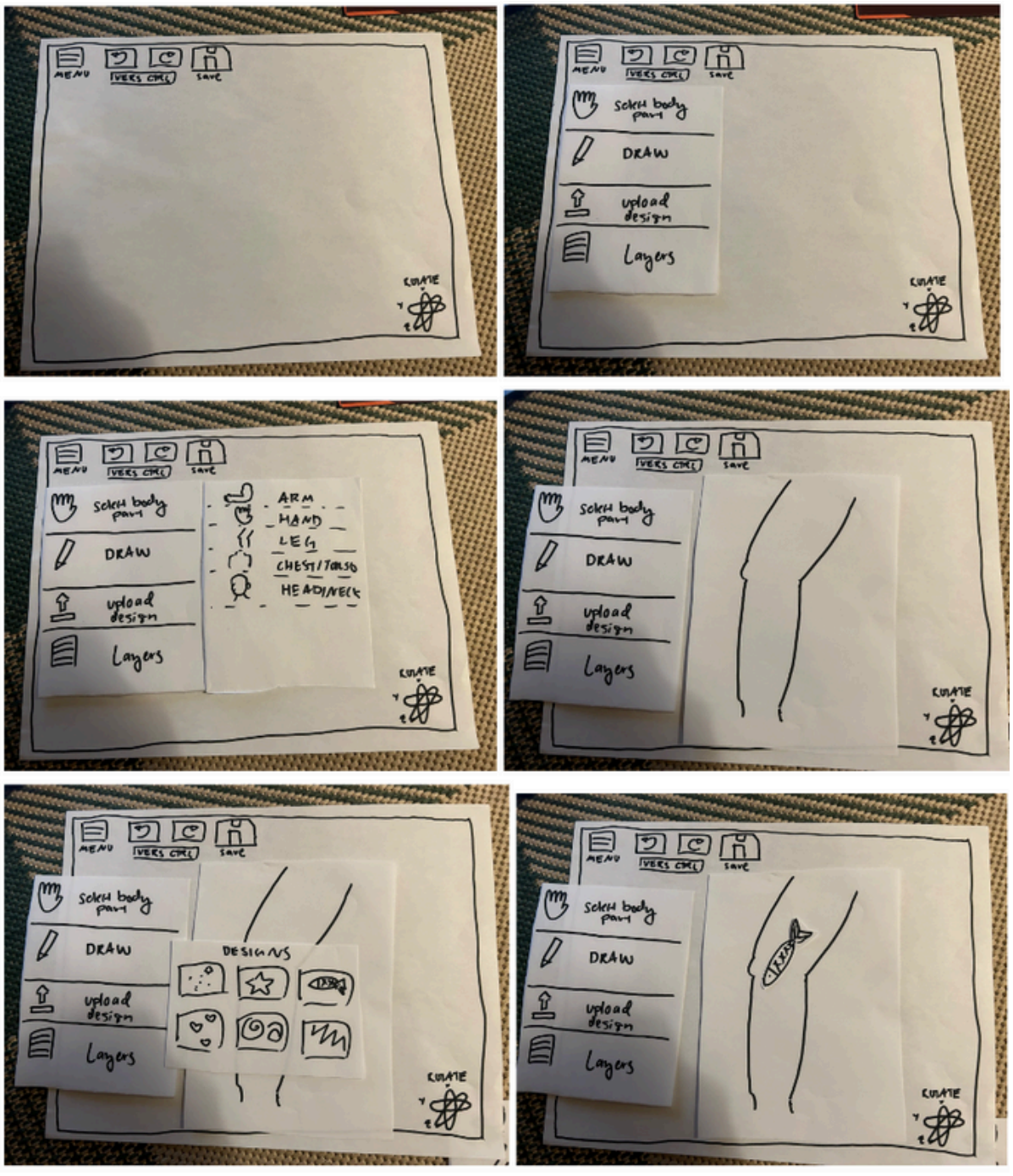
Support trial of tattoo augmentations on different body parts and their contours.

While the manifestation of these goals in Tattoo Doodler has evolved throughout the development process, they have remained beacons for the ultimate purpose of the tool.

2 IDEATE

LOW-FIDELITY PROTOTYPE

The initial interface design for Tattoo Doodler came in the form of a low-fidelity paper prototype. Key pages from the prototype are displayed below.



LOW-FIDELITY PROTOTYPE

User testing of the low-fidelity prototype yielded the following considerations for further design iterations.

- **Navigation and Icon Placement:** Users were confused by the current layout, particularly the "Rotate" function and the need to access a menu for core tools. Feedback suggests placing more frequently used icons at the top for easier accessibility.
- **Design Upload and Modification:** Users struggled with the blank canvas and were unsure whether to "upload design" or "draw." They also requested features like copying/pasting designs and editing existing ones, including changing color or line thickness.
- **Body Part Interaction:** Selecting body parts and positioning designs (e.g., on a leg) was intuitive and quick. However, users expected features like rotating the leg by clicking directly on axes and selecting different body styles.
- **Saved Designs and Version Control:** Users wanted a clearer way to access previously saved designs. Terms like "version control" were unclear, highlighting the need for more intuitive language or guidance in this feature.

USER PERSONAS

We created two user personas to try to envision the breadth of users Tattoo Doodler could appeal to. Our aim was for the imagined users to be foils to each other who both have the same end goal and need for using Tattoo Doodler.

User 1: Alex

Background: Alex is a 48 year old director at a finance company and is getting their first tattoo, a custom piece to honor their family. As a first time client, they are nervous about placement and have decided that they want the tattoo to be easily hidden, in a lower pain area, and to not be too expensive.

Goals: Because of the specific constraints Alex has for their tattoo due to being a first time tattoo client, their job, and the sentimental value, it's important for them to be able to visualize the tattoo design and try out different placements before their appointment. Having a tool will help them finalize the design and get feedback from their family, as well as hone in on a price range and feel less anxious and more prepared going into the appointment.

USER PERSONAS

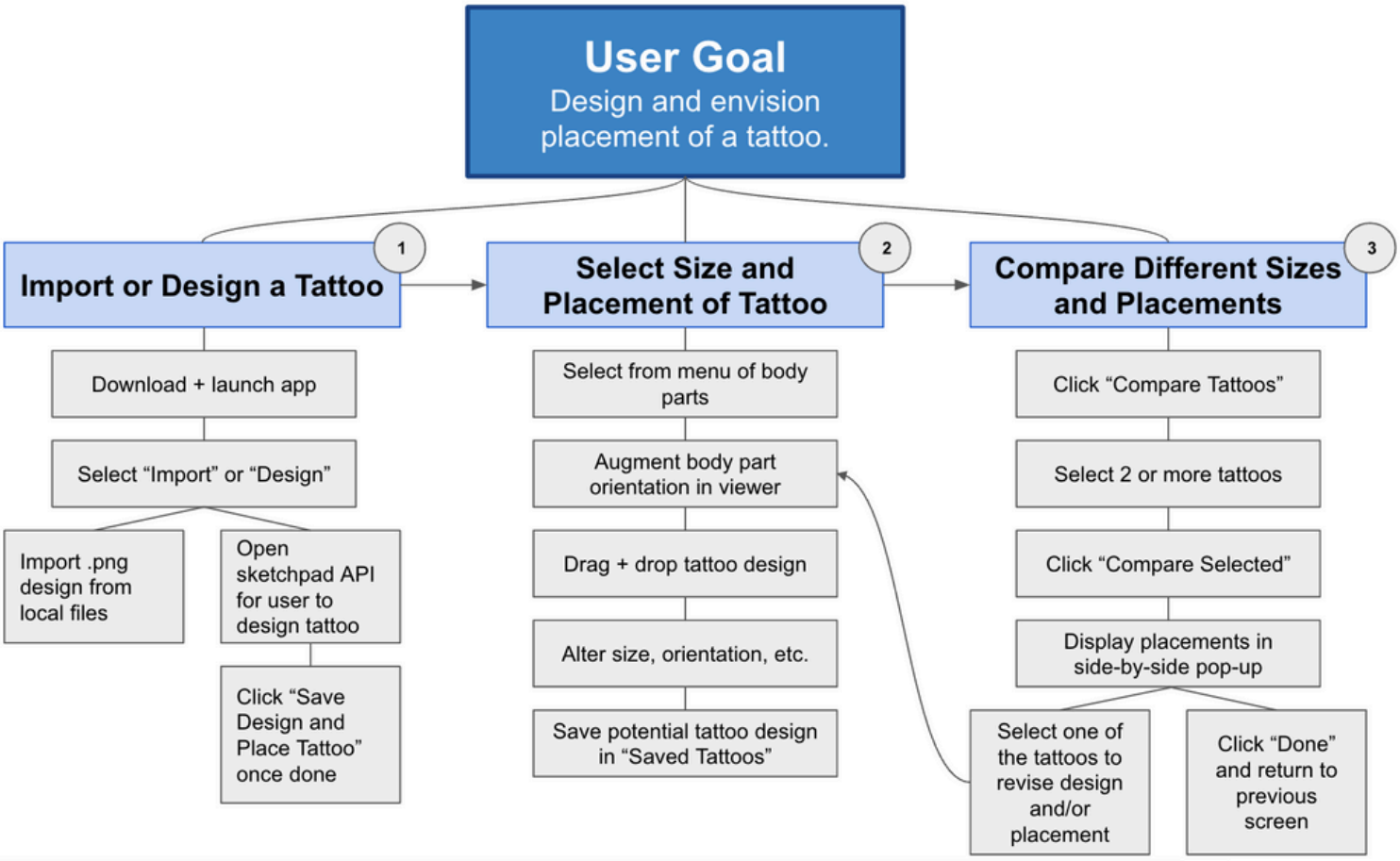
User 2: Ren

Background: Ren is a 35-year-old tattoo artist at a decently well-known shop in Los Angeles. They enjoy creating flash as well as working with clients to make customs and flow tattoos (where figuring out flow directly on a client's body is vital). They particularly love doing tattoos that work with and highlight the forms, curves, and muscles of the body. They take great joy in designing tattoos while watching TV and resting at home.

Goals: Ren currently has two main workflows for designing pieces: digitally drawing on Procreate and freehand drawing on clients at-appointment. While they adore creating freehand pieces (in which they sketch with a variety of marker colors directly on the client), it is a time-intensive process that requires both client and Ren to be available and together for extended time, cannot easily be practiced outside of appointments, and lacks the ability to easily shift/scale parts of designs or to make other edits to the design.

TASK ANALYSIS

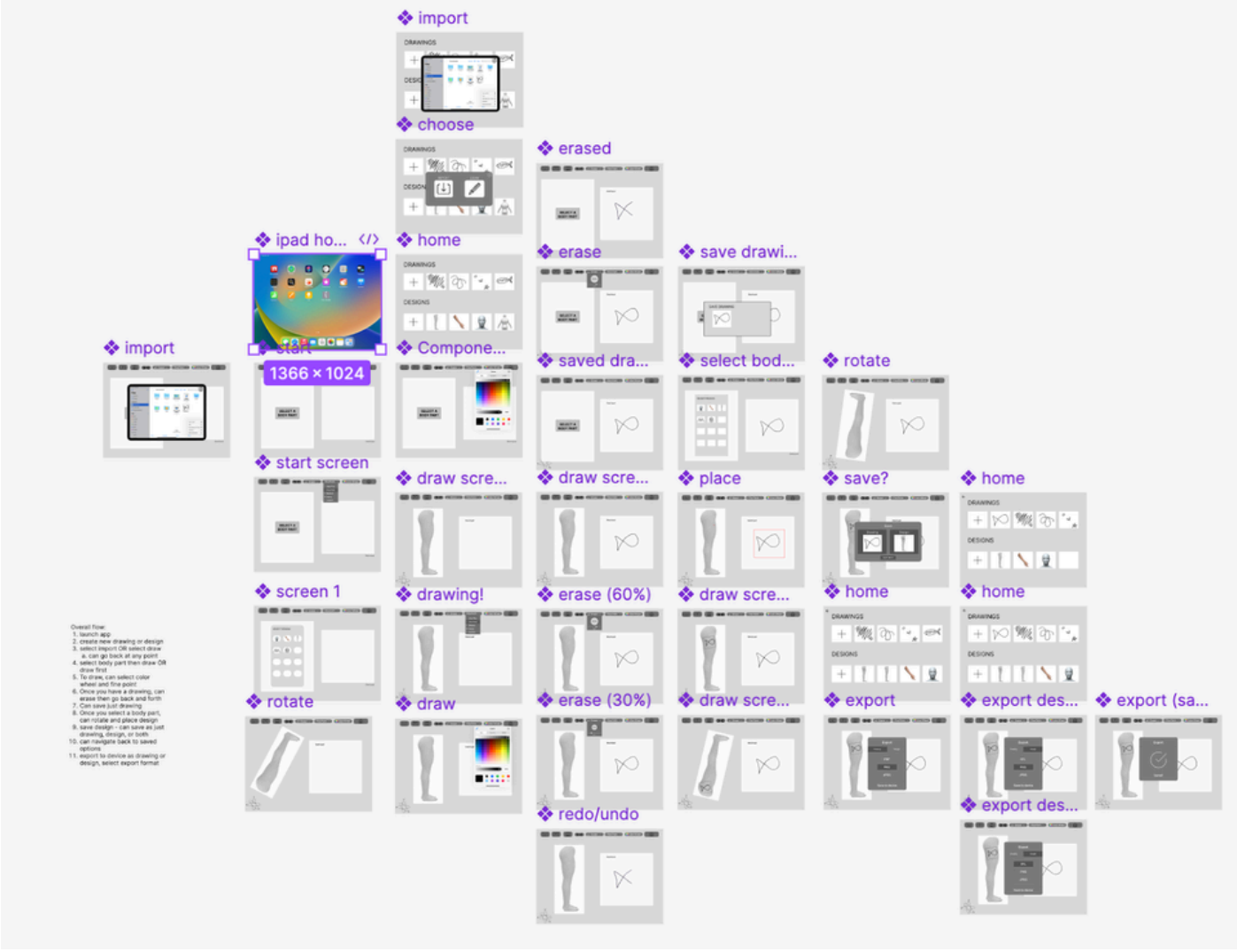
After the creation of the low-fidelity prototype and user personas to guide design thinking, we conducted a task analysis on the core functionality of Tattoo Doodler: design and envisioning of a tattoo. This was with the goal of helping inform the design and user navigation of our breadth wireframe described in Section 3.



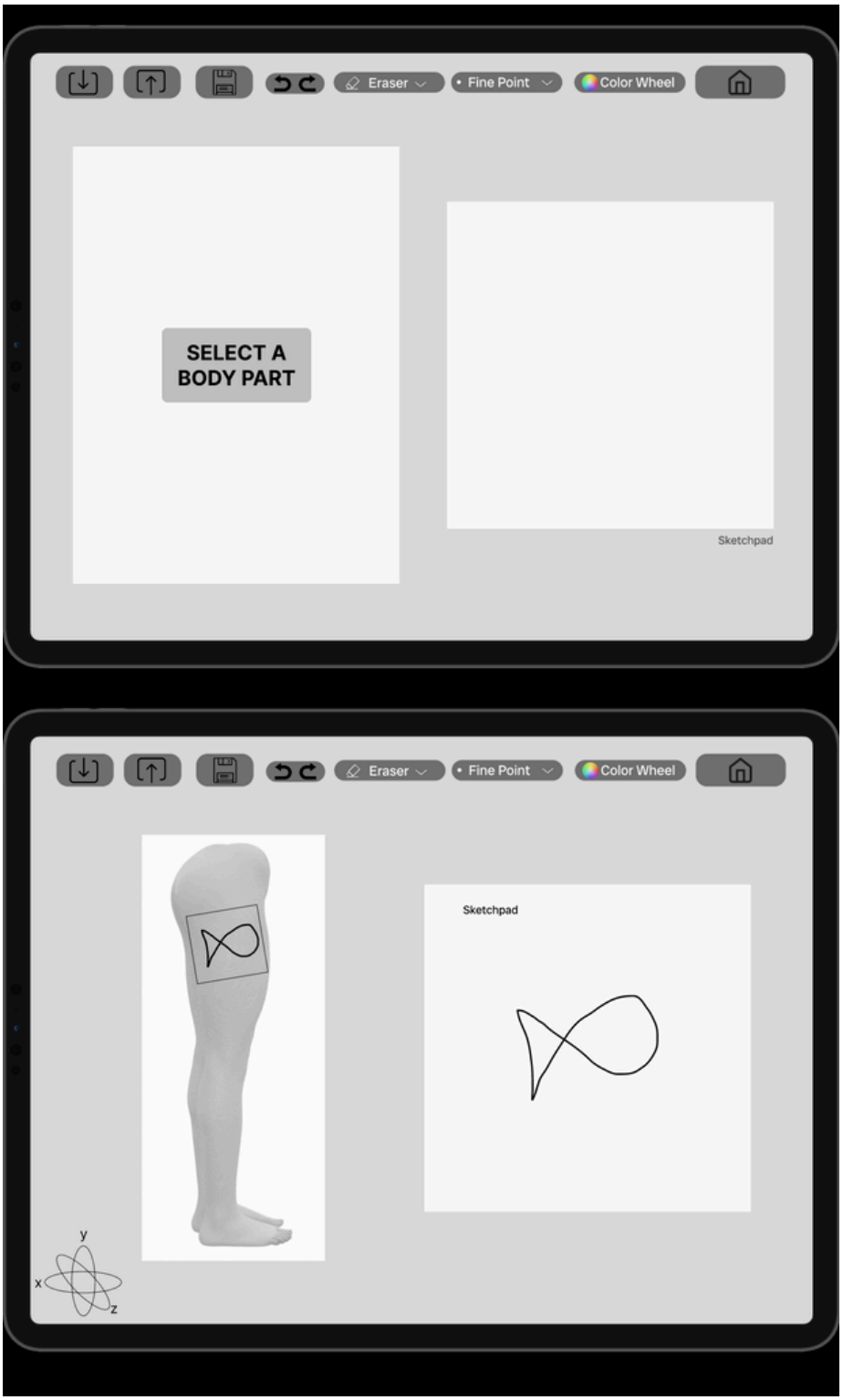
3 DESIGN

WIREFRAME

A Figma wireframe prototype was created as the first substantive design iteration of Tattoo Doodler. The goal of the Figma wireframe was to provide a more concrete demonstration of the user flow throughout Tattoo Doodler and identify areas/ and interfaces of the application that needed to be more user friendly and intuitive.



WIREFRAME



These two screenshots showcase two different interface states in the Figma wireframe prototype

WIREFRAME

Several evaluations were conducted by our peers using the Figma wireframe prototype, which helped guide our thinking to inform the functionality of the final TattooDoodler.

FINDINGS

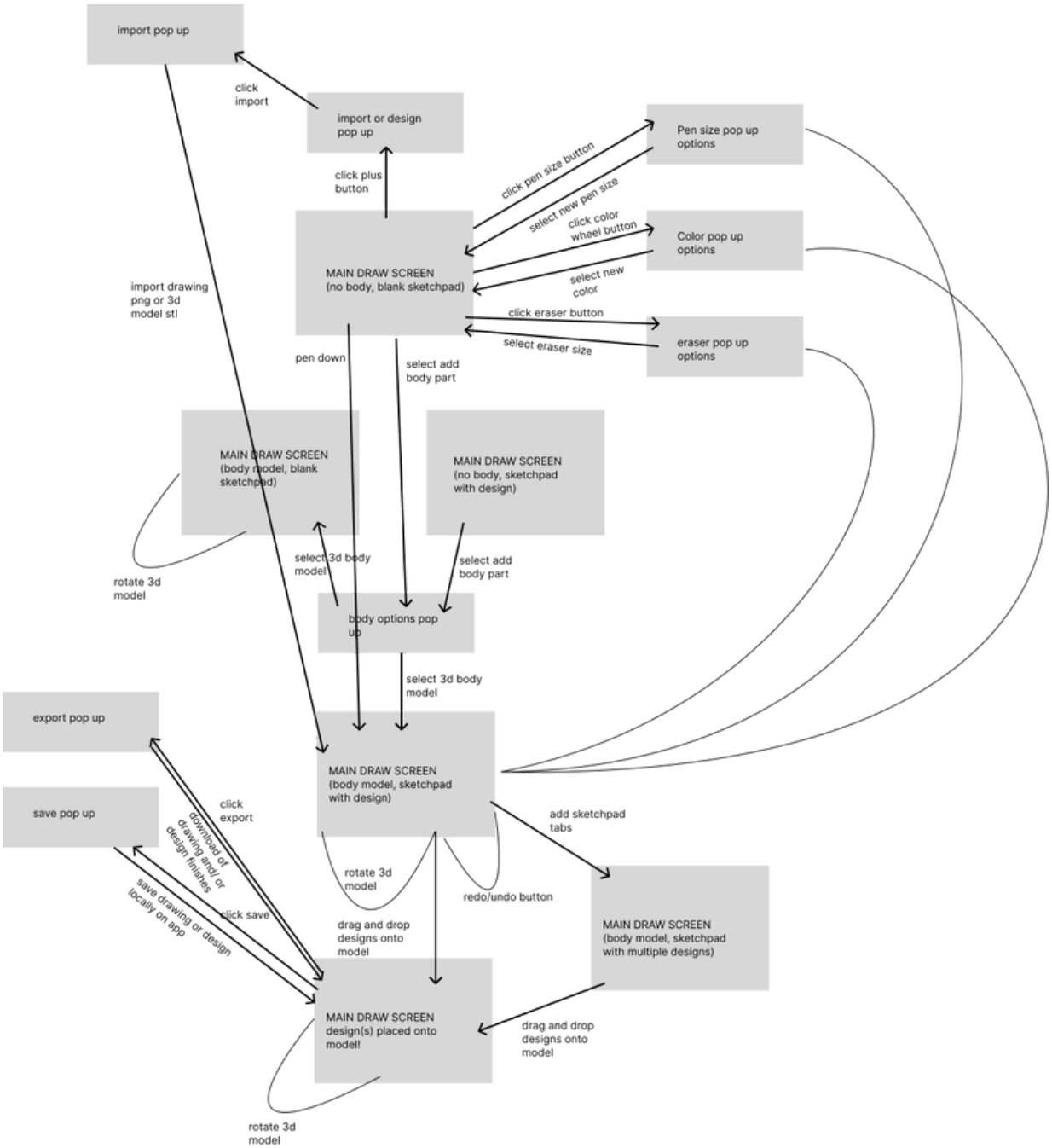
- **Intuitive yet Confusing Features:** Users enjoyed drawing, importing designs, but struggled with difference between “Drawing” and “Design,” and projecting designs onto models
- **Navigation Challenges:** Actions like selecting body parts, saving work were unclear, and most users needed guidance to use key features
- **Customization and Social Interest:** Users wanted features like uploading custom body parts (STL) and sharing designs with others

DESIGN REVISIONS

- Simplified, intuitive, **clearly labeled design transfer process**
- **Updated language for “Drawing” and “Design”** to reduce confusion as to the difference, or elimination of “designs”
- **Clearer workflows** for sketchpads, saving designs, and bounding boxes to improve usability.

SYSTEM DIAGRAM

Based on the input received from user evaluations of the Figma Wireframe, we created a system diagram that solidified our initial design decisions while implementing user evaluation feedback around flow intuition and labels.



4 IMPLEMENT

DEVELOPMENT

Development of TattooDoodler involved a combination of web and mobile technologies. React Native, React, and various stylistic and font libraries were utilized to build the core interface, ensuring a smooth, user-friendly experience. For 3D modeling, react-three/fiber and react-three/drei were implemented, allowing for the rendering and manipulation of 3D models directly within the application. The drawing functionality was achieved using html2canvas and react-native-svg, enabling users to draw on a canvas and convert these drawings into scalable vector graphics.

A significant development challenge was integrating the drawing features with the 3D model to apply them as textures. This required overcoming technical hurdles related to dynamically resizing, moving, and adjusting the drawing on the 3D model—a process that was more complex than traditional drawing applications. The solution involved customization of existing libraries, ensuring that the design could be accurately visualized and manipulated within the 3D environment. This unique integration of drawing and 3D modeling sets TattooDoodler apart from other drawing apps, delivering a more immersive and practical tool for tattoo design.

TOOL MVP

After two weeks of implementation, we conducted evaluations of the Tattoo Doodler minimum viable product in order to gauge ease of use of the implemented interface. The feedback gained from these informed later design.

FINDINGS

- **Intuitive Basics:** Users find the tool easy to start but unclear where to draw, often trying to draw directly on the body
- **Interaction Challenges:** Transferring designs and understanding save, import, and export functions need better clarity or automation
- **Customization Needs:** High demand for custom body parts (e.g., STL imports), predesigned tattoo libraries, and skin color options

DESIGN REVISIONS

- Label or **visually highlight the sketchpad** to clarify its purpose.
- **Simplify design transfer** with clearer instructions or drag-and-drop automation.
- **Add labels/tooltips for buttons** and support STL imports, tattoo libraries, and basic skin customization.

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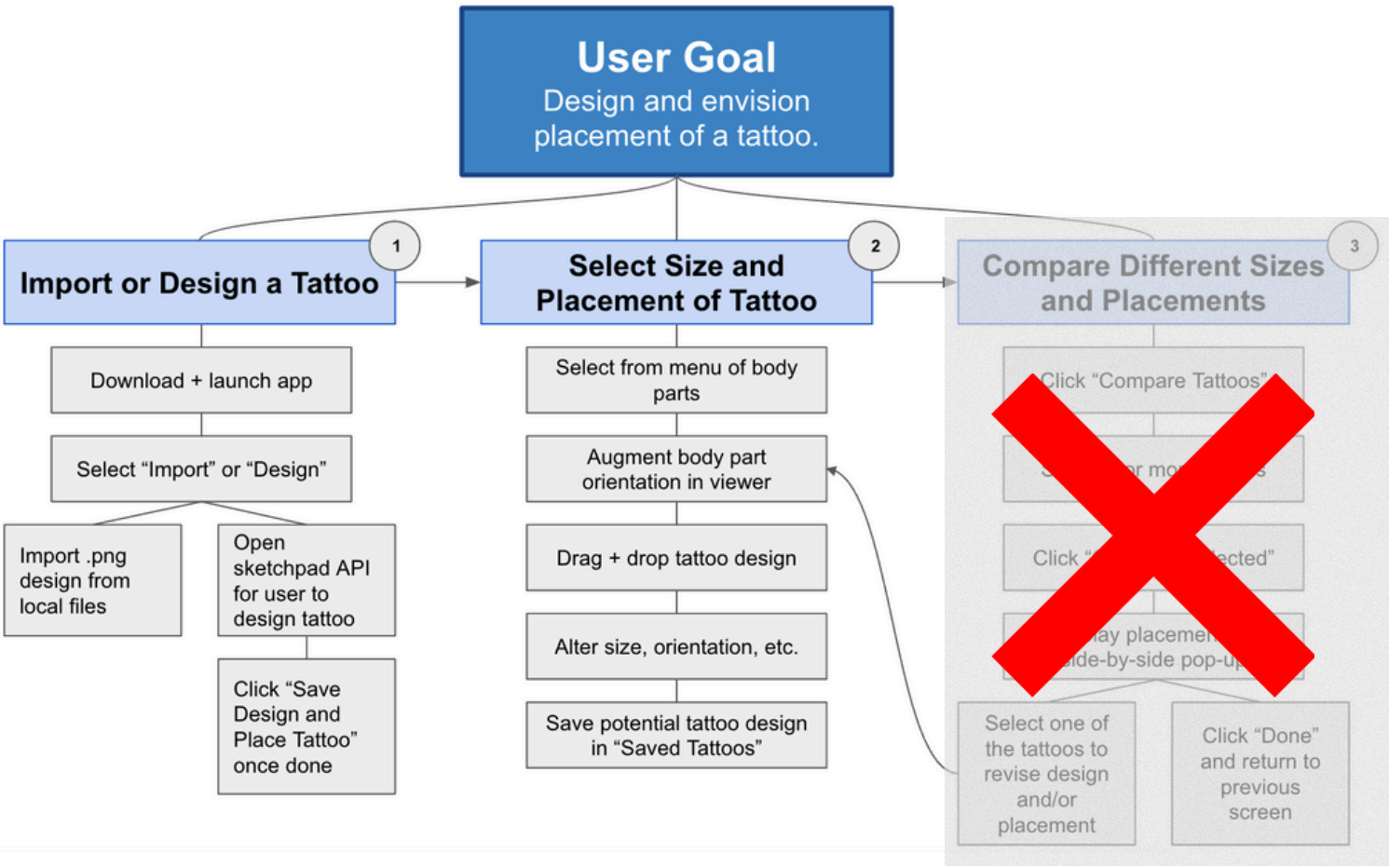
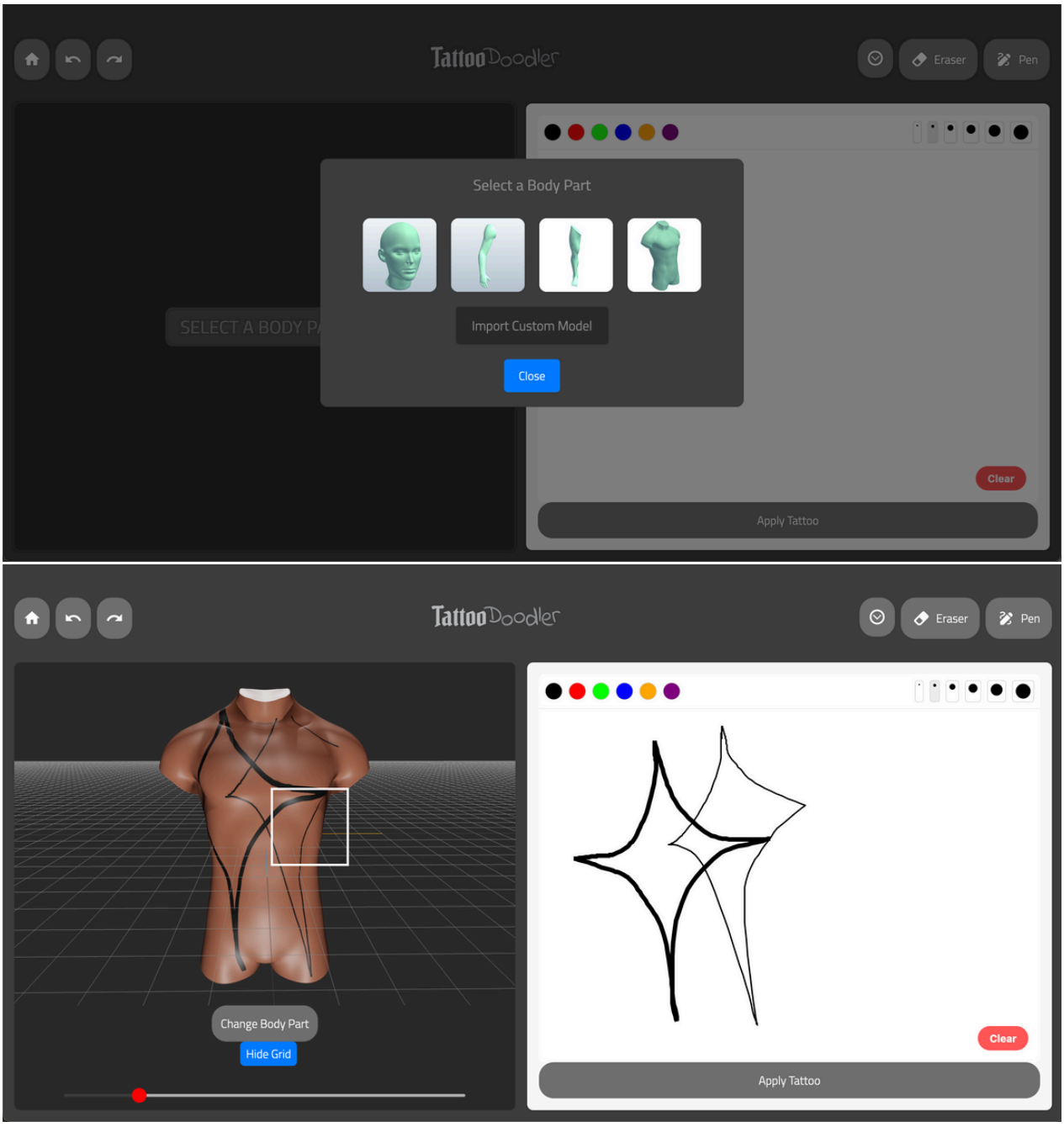
SCOPE REVISION

The time constraints of the design process for TattooDoodler resulted in revision of the final product and the functionality it would have. This reduction involved cutting the third portion of the flow of our task analysis.



We chose to omit the functionality to compare different tattoo designs and placements as outlined in Task 3. This feature was deprioritized due to the need for a back-end to save designs and the ease with which users can achieve similar results locally by viewing saved images side-by-side.

CURRENT VERSION



These screenshots show the body part selection and sketchpad projection in the TattooDoodler interface.

5 EVALUATE

FINAL EVALUATION

A final evaluation was conducted towards the end of development for TattooDoodler. The evaluation had two primary goals:

1. Assess if TattooDoodler provides users the means to complete the tool's original goals and the tasks we outlined in the Task Analysis
2. Assess if we adequately revised the design and functionality of TattooDoodler based on the feedback received from users at multiple stages of the design process.

In order to conduct this evaluation, we had X users utilize TattooDoodler to design and visualize a potential tattoo, with the following questions asked afterwards to acquire qualitative metrics on user experience:

1. How intuitive is the TattooDoodler user interface?
2. Did TattooDoodler give you a better idea (versus having no digital rendering/tool on hand) of how a potential tattoo would appear on your body?
3. Did TattooDoodler provide a widened range of creativity for you to experiment with and visualize tattoos?

FINAL EVALUATION

The final evaluation was conducted by 9 users, yielding the following feeedback about TattooDoodler's effectiveness. Note that the final evaluation was conducted when development was past MVP stage, but not yet finalized, so some feedback given is addressed in the final tool.

Intuitiveness of UI

- Generally intuitive: Most testers found the interface straightforward, with clear functionality for sliders and tools.
- Improvements needed: Clarify slider labels (e.g., "Size"), highlight active tools (e.g., pen/eraser), and distinguish body part views (front vs. back). Auto-save was appreciated, but saving/upload features need clearer labeling.

Widened Range of Creativity

- Testers valued the ability to iterate designs directly on the model, enhancing creativity compared to traditional methods.
- Uploading designs and better customization options (e.g., body type tailoring, fill tool) would further expand creative potential.

FINAL EVALUATION

Better Idea of Final Tattoo Appearance

- Projection onto 3D contours was highly effective in visualizing tattoos.
- Challenges: Drawing with a mouse was difficult; an iPad would improve usability. Adding more skin color options and refining the alignment of tattoos to body parts would enhance accuracy.

Key Issues and Recommendations

1. Drawing Tools: Highlight selected tools, improve eraser functionality, and add a fill button.
2. UI Improvements: Label sliders and features more clearly, and distinguish between body views.
3. Projection and Visualization: Maintain focus on projection for accurate tattoo placement; consider tailoring for body types where feasible.
4. Input Methods: Prioritize iPad compatibility to simplify drawing and enhance usability.

6 CONCLUDE

CONCLUSION

TattooDoodler addresses the challenge of translating 2D tattoo designs onto the natural contours of the human body by providing an iterative, digitally-enhanced medium.

Prior to prototyping, four needfinding interviews were conducted with tattoo artists and clients to uncover common challenges in the tattoo design and placement process. These interviews revealed two key pain points: the difficulty of visualizing flat designs on the body's contours and the lack of experimentation with size, orientation, and placement. These findings informed the guiding design principles of TattooDoodler: supporting real-time 3D visualization and enabling iterative experimentation with tattoo designs. Early prototypes, including a low-fidelity paper mockup and a medium-fidelity Figma wireframe, laid the foundation for the tool's interface and functionality, focusing on intuitive navigation and clear workflows.

TattooDoodler prioritizes creative autonomy and collaboration. It empowers users to project, adjust, and refine designs in a bidirectional process, bridging the gap between traditional tattoo artistry and digital visualization. This approach enhances artistic possibilities while remaining firmly rooted in the analog tradition of ink-and-gun tattooing.