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Motivation & Inspiration



The motivation for KidArt: Digitally Preserving and Displaying Children’s Art in the Home is rooted in the large amount of artwork that children bring home each week, from school or day care. Parents can be hard-pressed to find storage space for all the artwork, let alone the additional time and space needed to curate a display for it all.



As children’s creativity begins develop, they begin to create artwork on their own, with less parental or pedagogical guidance. Parents find watching this creativity develop a joy (see the following section, Initial Research: Results, for more).



The problem we seek to solve is *not* that children bring home a lot of art; it is that this artwork languishes in bins or closets and goes unappreciated. The wonderful opportunity enjoy this art is lost.

Team KidArt’s goal was to design a device that would allow easy storage, retrieval, and display of children’s art as well as one that could capture the value and emotional attachment both parents and children place on the art, augmenting the role the art currently plays within the home.

Initial Research

Methods

We conducted our initial user research as a series contextual and open interviews with parents and children from five families (all two parent households). The break down of participants and interview types can be seen in the table below.

Family	Composition	Location & Interview Type
1	2 parents (P1, mother), 2 children	home; contextual interview
2	1 parent (P2), 2 children	home; contextual interview
3	1 parent (P3)	coffee shop; open interview
4	1 parent (P4)	coffee shop; open interview
5	1 parent (P5), 3 children	home; contextual interview

Analysis

We recorded each interview. A group member not present at the interview transcribed that recording, and each group member reviewed the transcripts before we met to analyze our results. We created an affinity diagram (below), and drew conclusions based on that diagram. We broke our results down by the categories used in our affinity diagram. In the following section, you will find our original conclusions, exactly as written up by group members.



Results

Parents on the stories kids tell about art

Parents value the stories their children tell about art, but don't always remember them.

How kids react to own art

Kids are proud when they do something new or different well. Some like to display art and are proud it is on display, others are less excited about display but still extremely reluctant to throw anything away. Older kids describe their art differently.

Parents on art

Parents like to keep art that reflects children's growing abilities and creativity.



**"I prefer to keep things
he's done on his own . . .
It's nice to see his
creativity now that he's
starting to get some."
—P1, on a picture of a farm
her son drew**

Parents on use of art

Parents like to look back at collections of old art, as well as sharing it with family.

Display locations

Art is displayed in central, family locations, but also at work or in family member bedrooms. It is always in a place where it is easily seen.

Display limitations/constraints

Some art is too big to display in usual location. Displays are often constrained by space, and not everything that is kept is displayed.

Display/art choices

Parents don't display all the artwork they want to keep, some is saved for later use (e.g., scrap-booking). Parents often choose what art to display, though kids get some input.

Display methods

Parents tend to choose easy and inexpensive display methods. Some display art so kids know it is valued.

Kid art production

Kids, especially younger children, produce a lot of art. It is hard for parents to keep track of/sort because of this volume.

Storage Methods

Storage methods are universally cheap and convenient, often containers reused from other purposes.



"I use boxes left from moving, since that's what we had when they started bringing art home."—P5

Parents on technology

Not all parents are comfortable trying new technology.

Art styles of kids

Art styles vary, especially related to fine motor-control; some kids don't draw a lot because they are frustrated when they can't draw something "right."



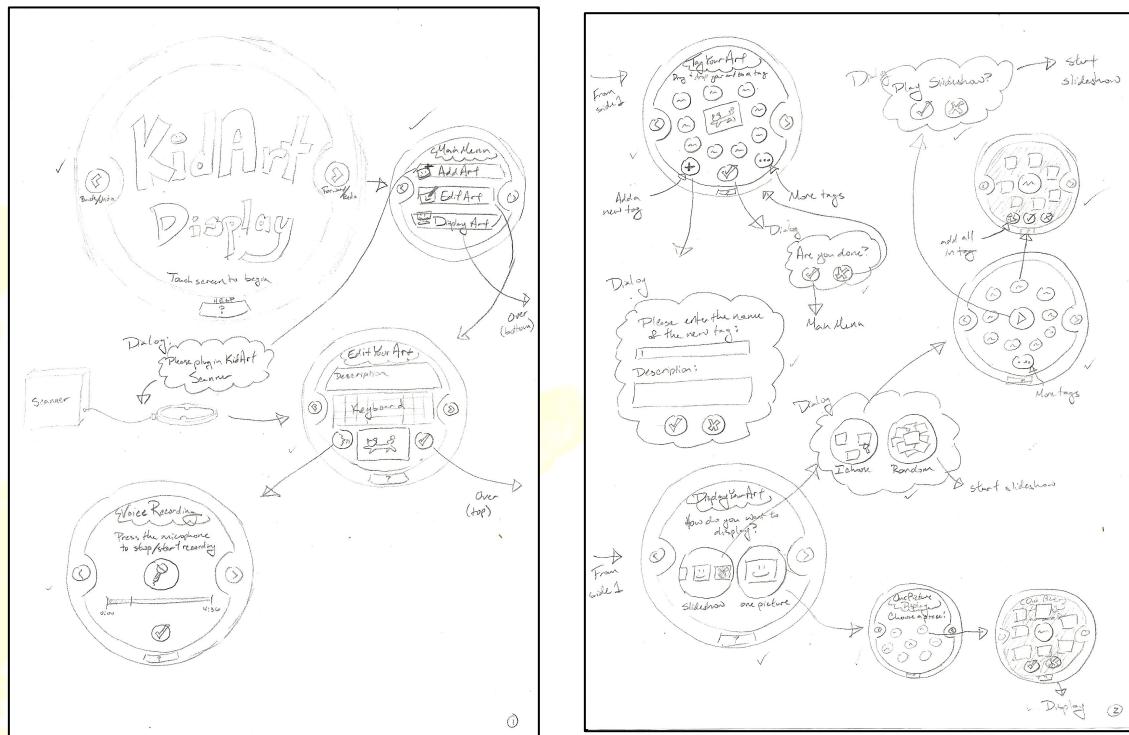
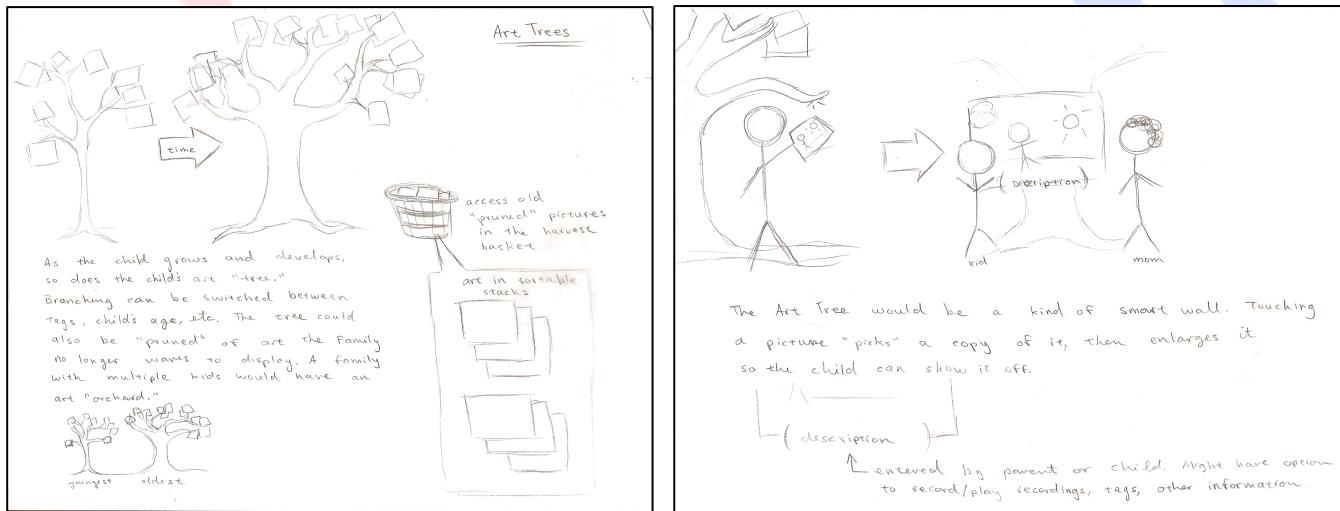
Figure 1 Inspiration Board

Prototype Evolution

We initially pursued two design trajectories. The first was a tree with artwork "leaves" that would begin as a sapling and subsequently "grow" with the child, and that we intended for display on some kind of smart wall. The second was a plate that projected artwork as a three-dimensional holograms.

Paper Prototypes

Below are sketches for both initial ideas.



Mid-fidelity prototypes

Below are computer-based renderings of each idea.



High-fidelity combined prototype



Figure 2 Cardboard tree prototype

After more brainstorming sessions, we opted to combine what we felt were the best elements of the two ideas we'd been working with up to that point. We created a holographic tree, projected from a planter-like base, that would display art leaves. We felt the 3D aspect was important because so much of the art children create is actually three-dimensional. We turned the menu from the 3D-plate design into a "pond" menu implanted in the tree's base. The pond is represented by a circle of paper on our cardboard prototype. Other aspects of control are enabled via three-dimensional gestures.

We also designed a scanning device, to be used in conjunction with the pond menu to add artwork. Once added, artwork can be annotated, with written or audio comments describing the picture, or with user-specified keyword tags.



Figure 3 Scanning device



Figure 3 Pond menu



Figure 5 Annotation "screen"

Usability Studies & Design Revisions

We conducted a series of usability studies with four families, using Wizard-of-Oz techniques and the think-aloud protocol. A table with a break down of study participants is shown below.

Family	Initial Research Participants	Usability Study Participants
1	2 parents, 2 children	2 parents, 2 children
2	1 parent, 2 children	
3	1 parent	
4	1 parent	2 parents, 1 child
5	1 parent, 3 children	
6		2 parents, 2 children
7		2 parents, 1 child

Results from testing were mixed: families loved the device, but using it was not as intuitive as we had thought it would be. Children got very excited when their artwork “appeared” on the tree, and were proud to point it out to their parents. One even wanted to keep the tree, and was enthusiastic when his mother promised they would make a similar tree the next time they did crafts. Children also liked it when they got to record things about their art, and when their parents wrote comments about their art. Children had no trouble figuring out how to add art to the tree. Parents were most interested in the ability to automatically redo the display, especially according to themes or events.





Figure 4 Updated tree prototype with new buttons.

Almost all difficulties users had in testing the device centered on the pond menu. Users got confused once they'd navigated away from the tree and could not figure out how use the menu to return to that initial view, so we added a permanent "home" button (buttons shown in Fig. 6). Additionally, some functions we had initially included in the pond menu were redundant and confusing, so we simplified the menu options (Fig. 7) so that they were limited to customizing the tree's display. The most significant result from user studies was that we discovered we had failed to design a way for users edit artwork annotations. We'd included the "tapping" gesture to view the piece, but no way for users to begin adding information or comments, and we had to significantly redesign this feature. The new annotations

window with options to add comments is shown in Figure 8. Without usability testing, we would have left out the most important aspect of our design, demonstrating how crucial user-centered techniques are as design moves forward.

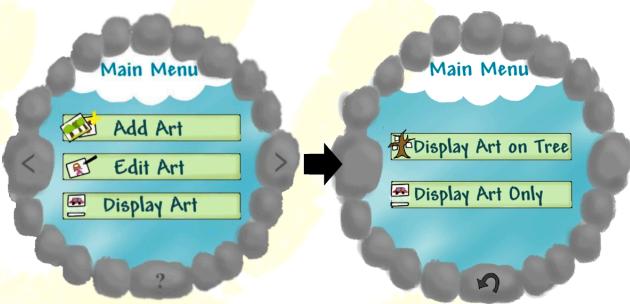


Figure 6 Simplifications made to the pond menu.



Figure 5 Revised annotation "screen."

Possible Future Directions

Other features we imagine adding for this device include: a web or smartphone-based application for adding art and controlling the tree, as some parents thought that would be easier; a “playback” feature, so that parents could watch a slideshow of their child’s (or children’s) art over the years; and customization options for types of tree and projection bases.

Our solution, while technologically out of reach at present---though perhaps not as far away as we thought at the start of this project, see Mistry & Maes, 2009, Butler et al, 2011, Ozaki et all, 2011, and Hilliges et al, 2012---demonstrates one possible way to reduce the stress of not knowing what to do with children’s artwork. It enables families to take advantage of the opportunity to enrich their lives and homes with the expressions of their children, in a way that is convenient and beautiful.