# buddy blocks

Seattle Children's Dialysis Unit

**Prototype Evaluation Readout**
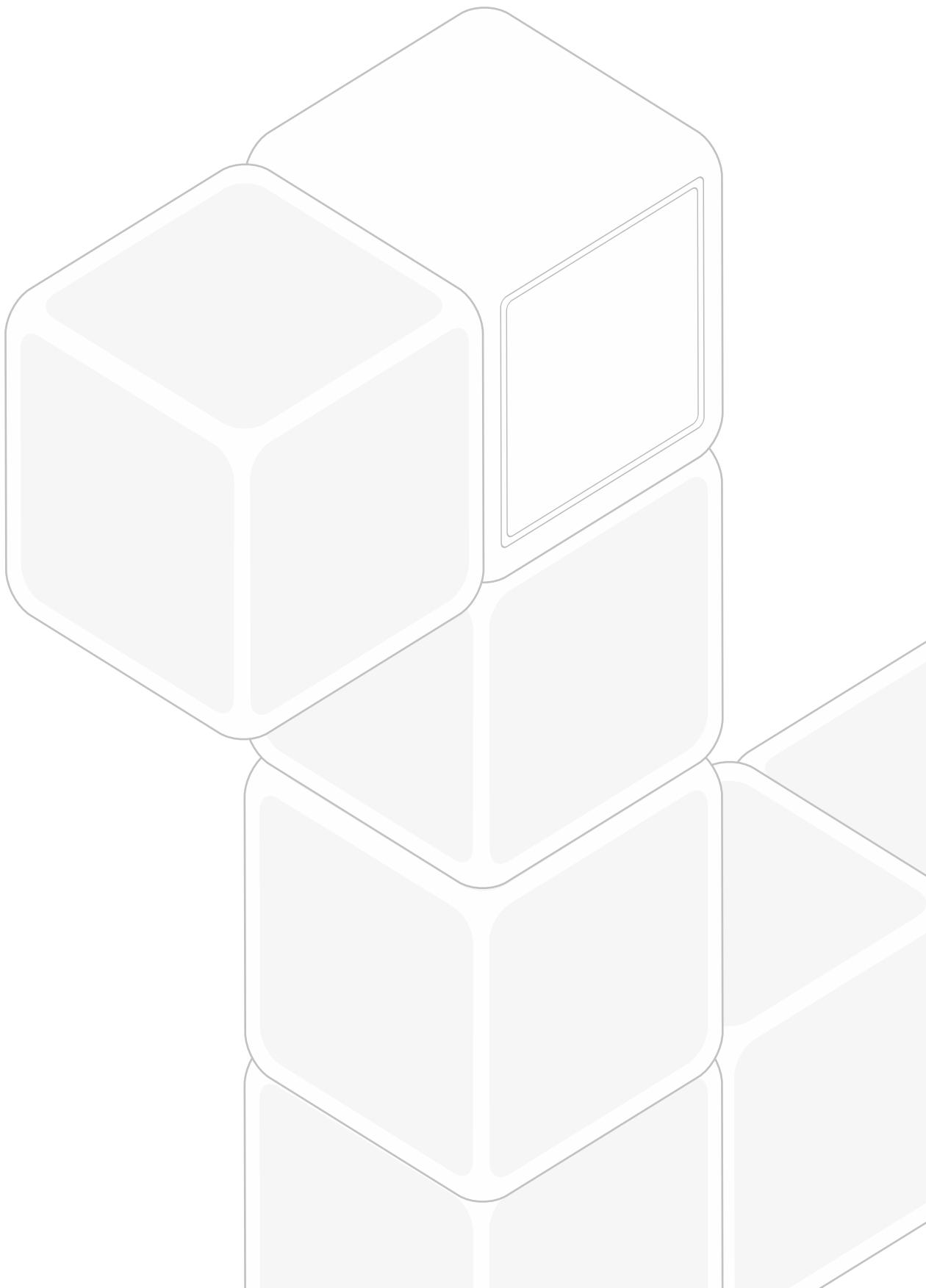
Brandon Caruso, Michael Frampton, Megan Wilson

Ari H. Pollack, MD, MSIM — Sponsor

overview

Patients use the blocks to build creations to share with other patients. Each patient has their own set of blocks that can be combined together through magnets. Each blocks communicates with eachother through short range infrared transceivers and communicates with and iPad through RF (radio frequencies). Each block in the set has a separate function and can be connected through magnets to form a creation. There are four types of blocks: sound block, display block, camera block, and light block. A total set includes 27 blocks; 20 light blocks, 4 display blocks, 1 sound block, and 1 camera block. To capture custom images, video or audio the patient uses the camera and sound blocks. This custom content can then be used in their creations by touching the camera block to an image block or by including the sound block in their creation. Patients can send creations to specific patients or simply share with the entire unit by posting to the gallery. This is done through a companion iPad application. The companion app also shows patients how to build creations sent to them from other patients. Creations must be assembled by the recipients using their own blocks.

prototype evaluation methods

blocks

Using magnetic foam core blocks, the team crafted a story to establish a context for patients to evaluate the different forms of interaction with each of the block types.

6 Participants

5 Dialysis Patients – 3-16 years old

1 Child – 3 years old

mobile application

Using paper interface mock-ups, the team ran through the main interaction flow. Specific interest was given to the build instructions for assembling creations.

4 Participants

1 Dialysis Patient – 7 years old

1 Child – 3 years old

2 Adults

1

clearing content a challenge

Deleting or clearing content on blocks was a struggle for the participants. The current reserved shaking action was not obvious for many of them, in fact it was used in other contexts like changing colors.

moving forward - incorporate on-boarding experience

Deleting content on the blocks will still be completed by shaking the block. The team is looking to leverage on-boarding as a quick an easy way for users to gain familiarity with the functions of each of the blocks. Clearly discussing the unique and novel interactions will help with adaptation of the interaction vocabulary used consistently across blocks.
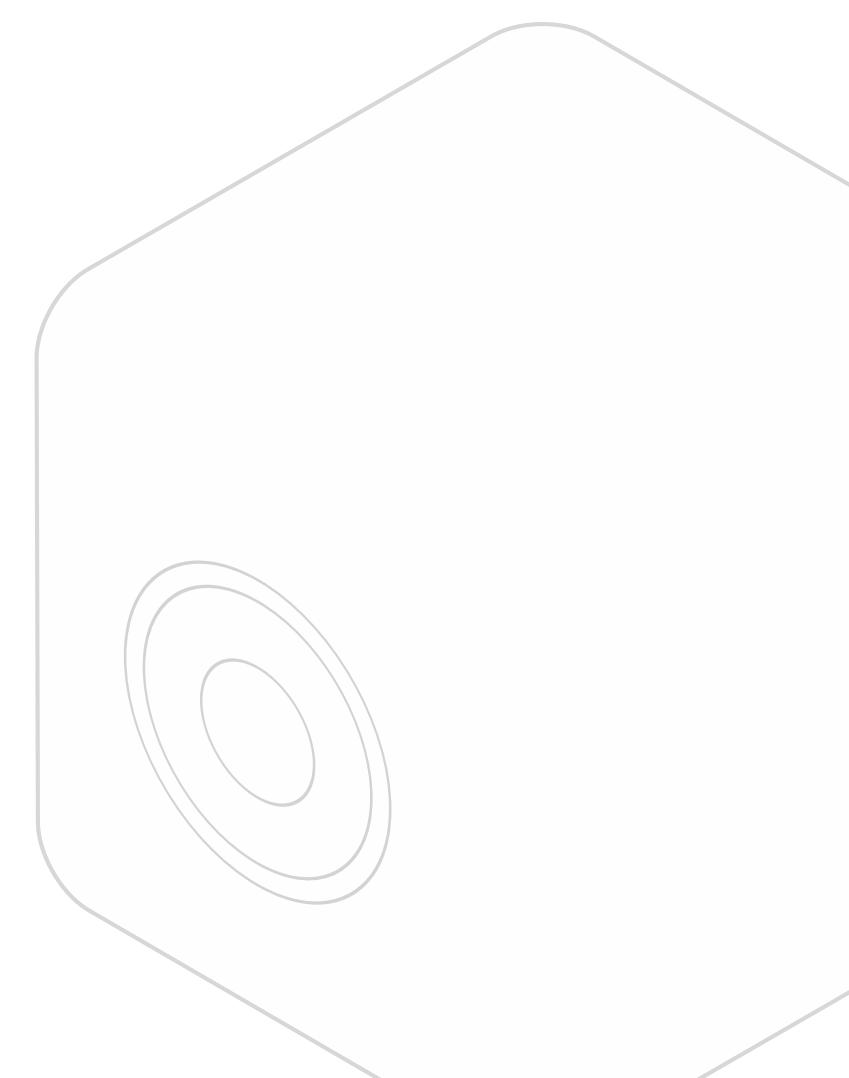
2

needs feedback

Blocks need more feedback, so users understand that actions have been completed and if there is content on a cube.

moving forward - using light and sound

The capture blocks (sound and camera blocks) lacked clear feedback that many participants expected during the tests. Using light and sound, the team hopes to establish clear feedback on the blocks themselves. In the case of recording, a short sound will signify the start of the recording or an artificial shutter sound will signify the taking of a picture. Something many participants added themselves during the evaluation. For long recordings, like video or audio recordings blocks will pulsate with light as the recording takes place. Once media is on these capture blocks the light will remain solid. When transferring image or video to a display block, the light will pulsate once when the camera and display blocks touch signaling the transfer of the media.

3

only one sound block

Many participants assumed that the microphone block could also playback sound.

moving forward — merging speaker and microphone

Speaker block and audio recorder block will be condensed into one sound block. The press and hold action will be used to record audio, press to playback, and shake to clear.

4

magnetic attraction

Participants enjoyed the magnetic properties of the blocks, however, due to the random arrangement of the magnets in the prototype interacting with the blocks was frustrating.

moving forward — think like a magnet

While we cannot change the polar property of magnets, we can address this issue by arranging the magnets in such a way that opposing faces of the blocks have opposite polarity. This is based on a common tactic participants used. When trying to attach two blocks, if the current face was repelled they would try the opposing face next.
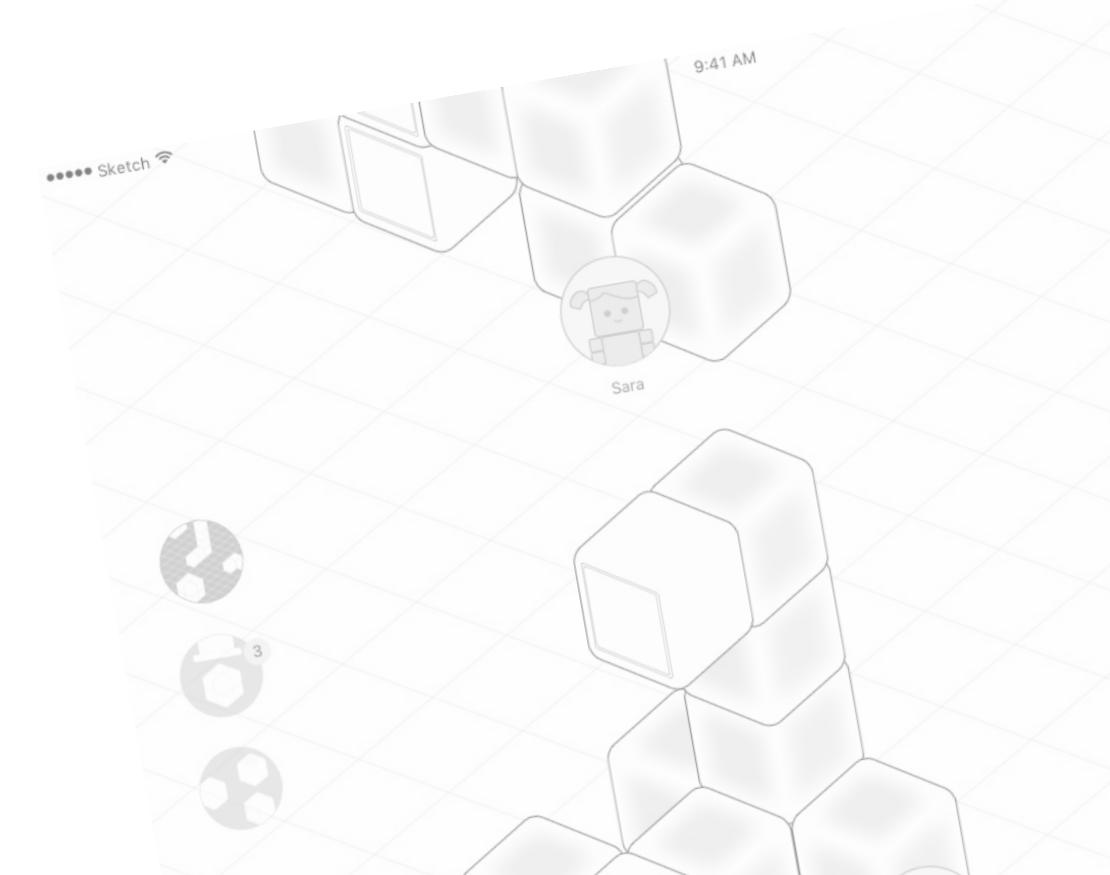
5

confused on landing

Starting on the gallery page in the iPad application is confusing for users.

moving forward — open on build screen

Participant made it clear that they would like the application to open up to the build page. This made sense to the team as the primary use case is to build a creation to share with others. Viewing other creations is a secondary objective. The next iteration will have the build screen as the initial screen for the application.
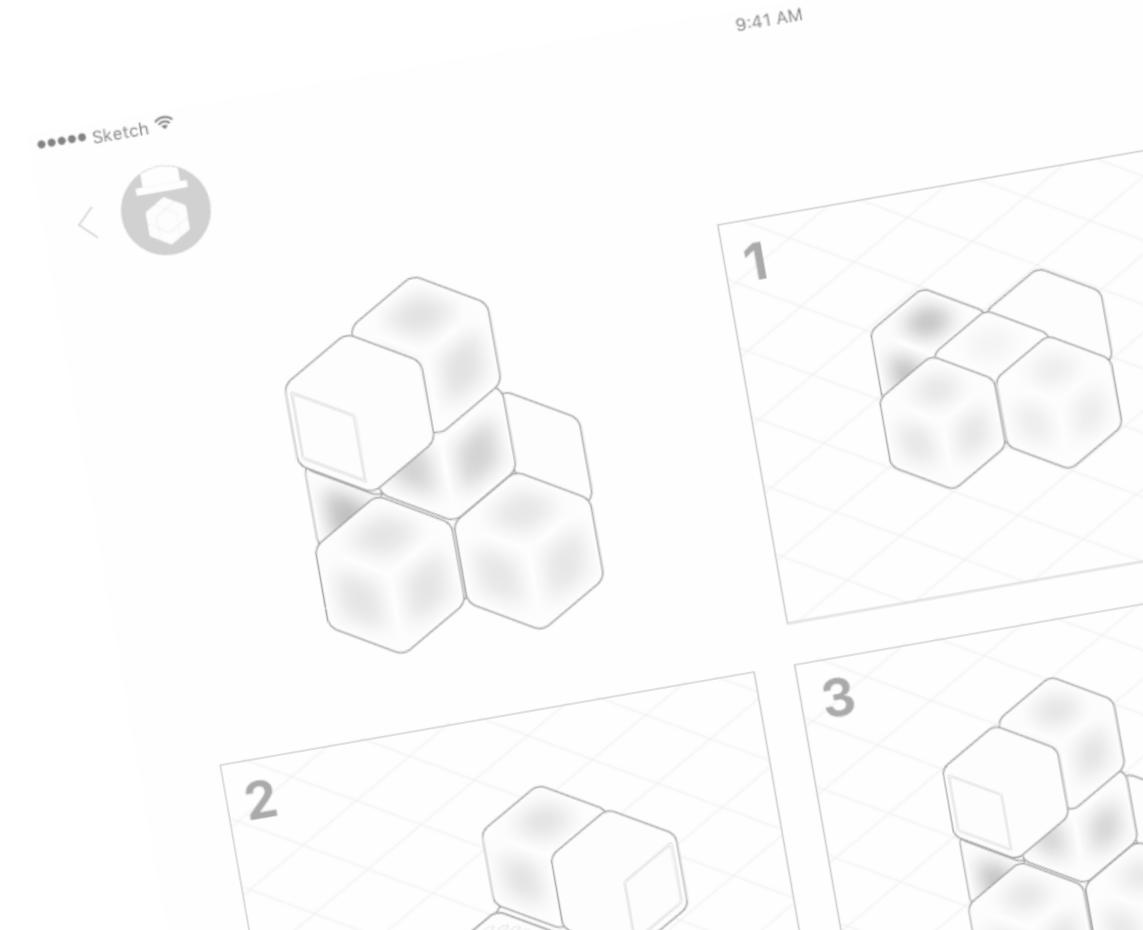
6

instruction complexity

Instruction preference varied wildly amongst participants. It was clear however, that the piece-by-piece instructions were the most friendly for all users.

moving forward — piece-by-piece

Piece-by-piece instructions will be the default instruction approach used in the application. The team will leverage animation to better help communicate the placement and connection between blocks. Rotation around the vertical axis of a creation will also be incorporated into the viewer to allow for clear viewing of all the blocks used in the creation.

9:41 AM

•••• Sketch

1

3

2

storyboard

Sam just got done working with the art therapist. She helped Sam make a picture of a seascape using water colors. Sam knows that Darren and Tiffany both love to swim and he wants to share his painting with both of them.
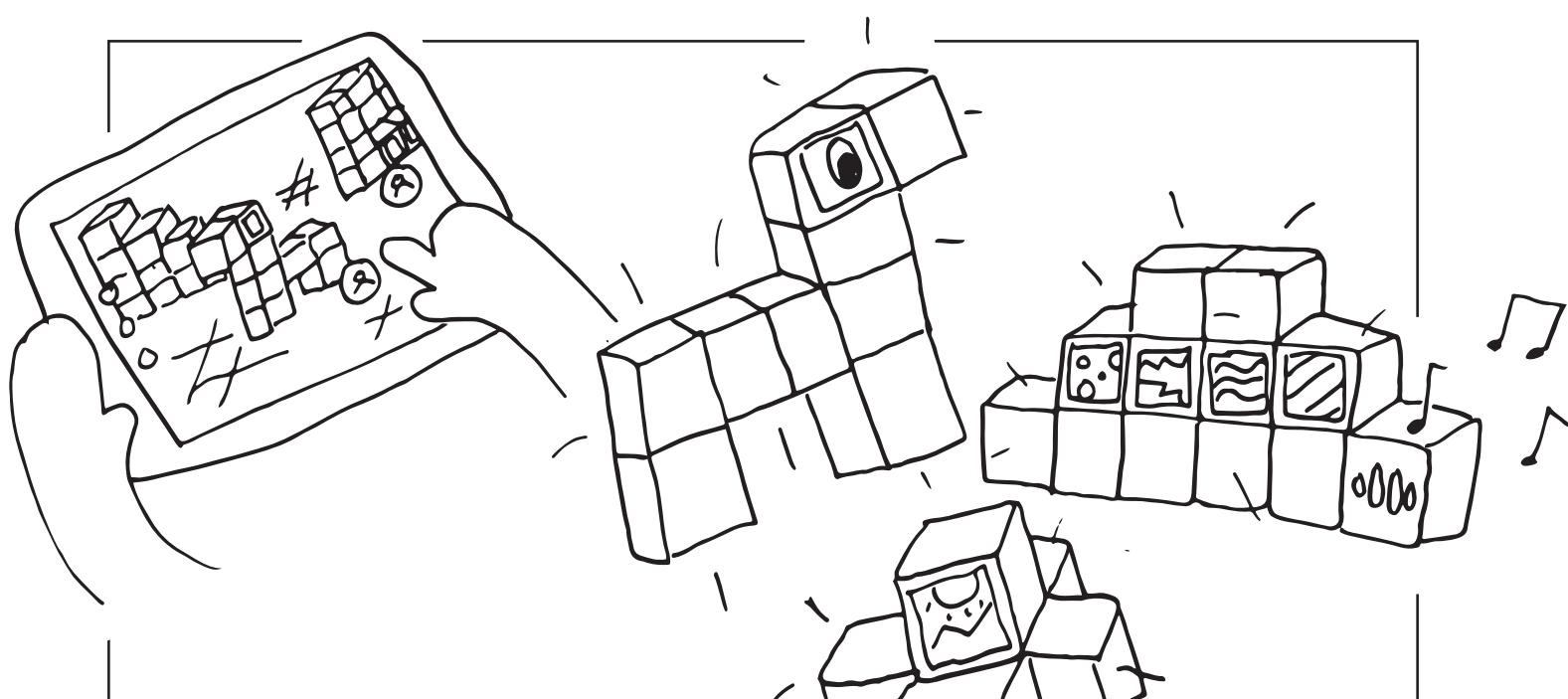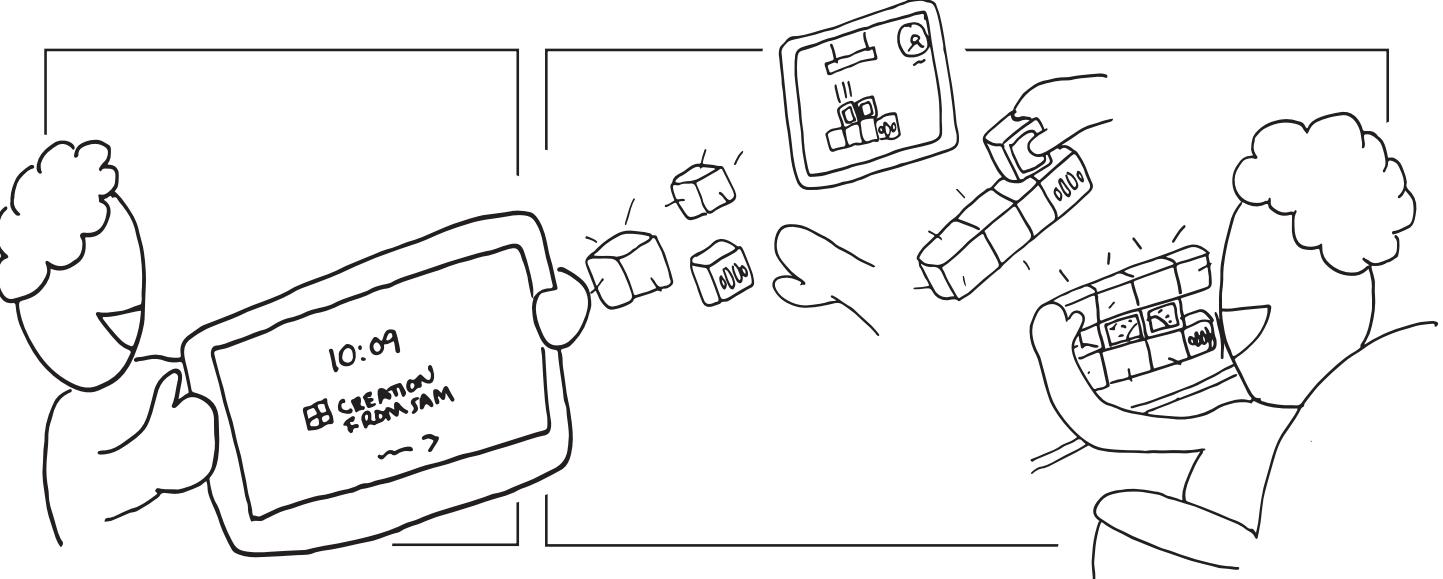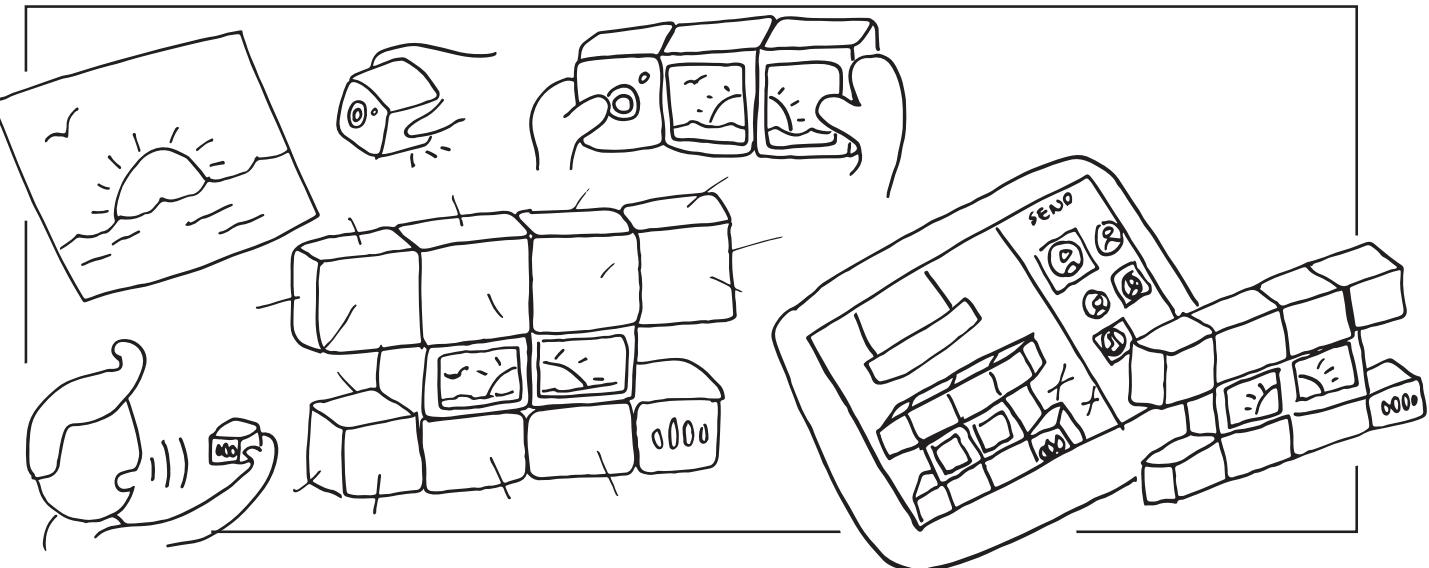
He takes the camera block, points the camera at his watercolor painting, presses the sides of the block, and captures the image. Taking some display blocks, he touches the camera to the block to transfer the image. The watercolor painting appears scaled across the displays. To add to his creation, he uses the sound block to record the peaceful crash of breaking waves by pressing and holding the sides of the cube. To connect the sound cube and display blocks Sam, adds some blue and yellow light blocks.

While Sam was building his creation, the blocks wireless sync with the iPad application showing a digital representation of his creation on the screen.
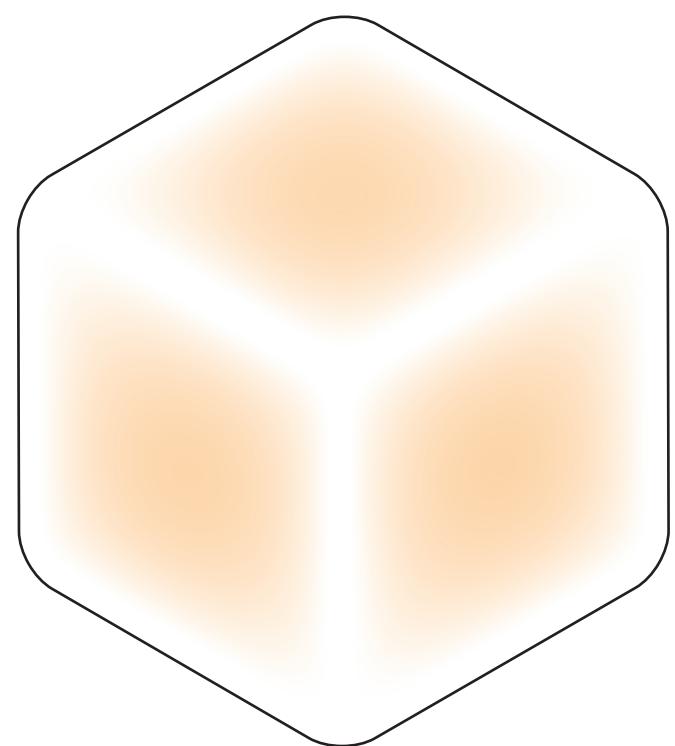
Happy with his creation, Sam taps the share icon and a list of patients appears on the screen. He selects Darren and Tiffany on the recipient list. He is so happy with his creation that he even wants to post to the gallery. Pressing the send creation button, the creation is sucked up the tube on the top of screen and sent to each of the recipients.

Darren sees he has a new creation from a notification he receives on his iPad. Tapping on the notification, the app opens to his inbox where he sees the creation from Sam. By tapping on Sam's creation, build mode opens and Darren's own blocks light up with the right colors. Following the instructions on the iPad, Darren begins to assemble Sam's creation. Once assembled he can hear the sound of the ocean and see the beautiful watercolor. He loved it!

Darren, in the mood to build another creation, can see what the other patients in the unit have made. He navigates to the gallery in the iPad application. He explores the gallery looking at different creations and decides to even create a few. Every creation is so unique and interesting!
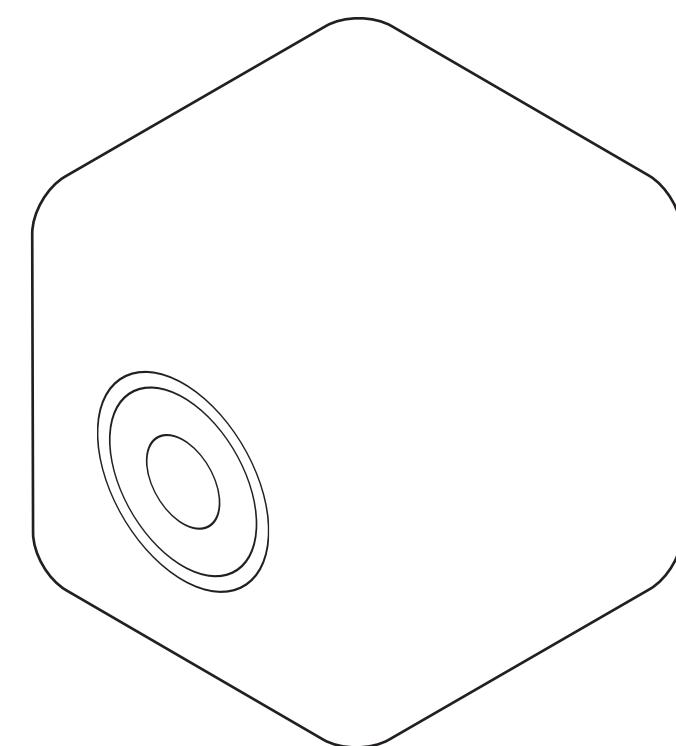
block types
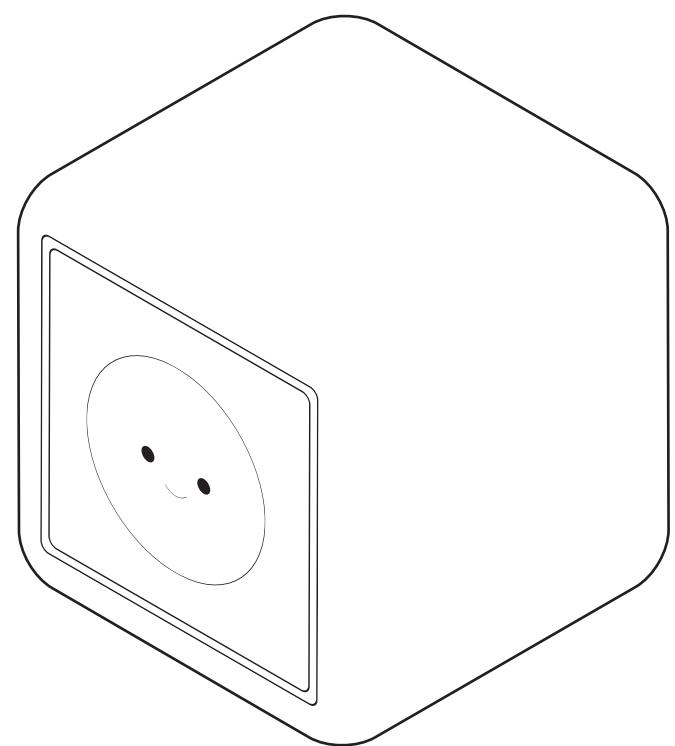
light

Emits different colors of light.
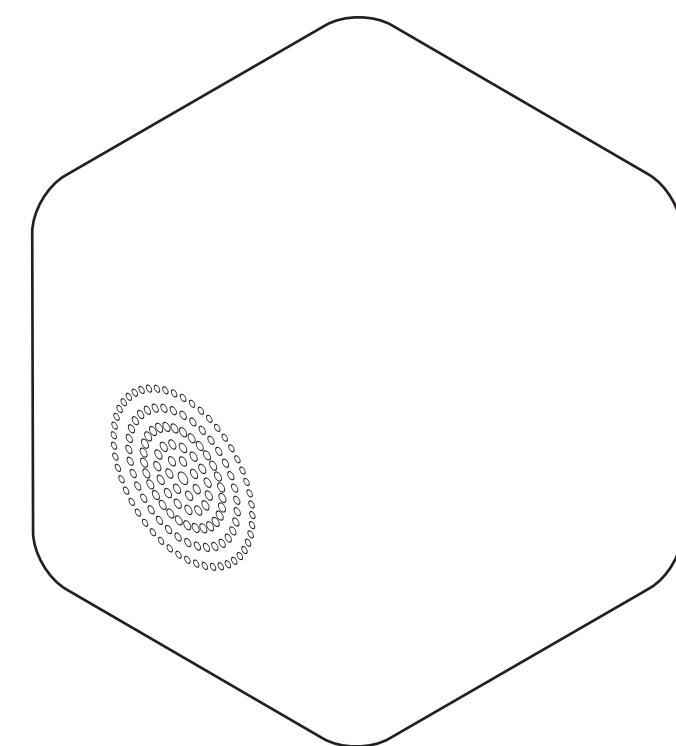
camera

Used to capture pictures and record short video clips.

display
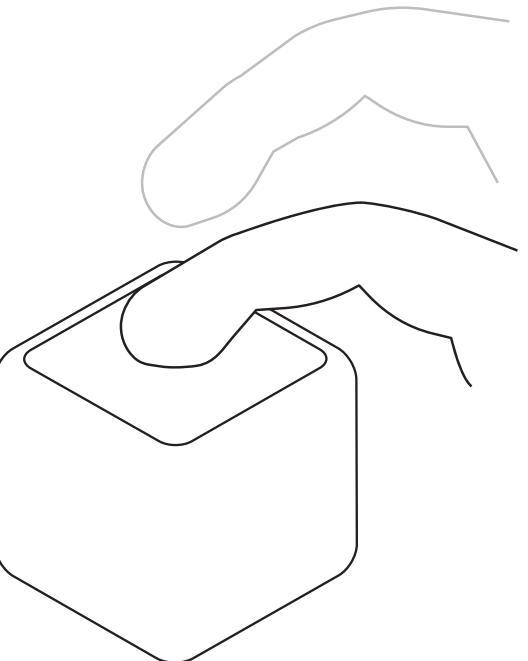
Contains one side with a screen. Used to display images and video. Combined multiple displays to scale images.

sound

Used to capture and playback short audio clips.

block interaction language
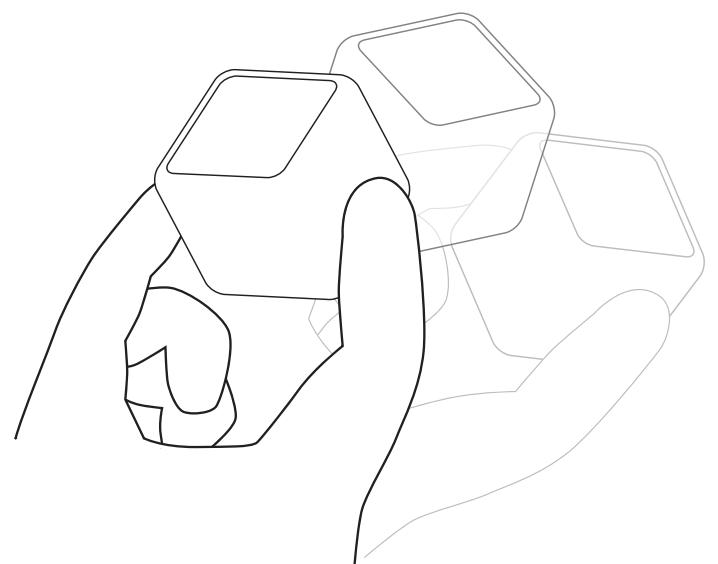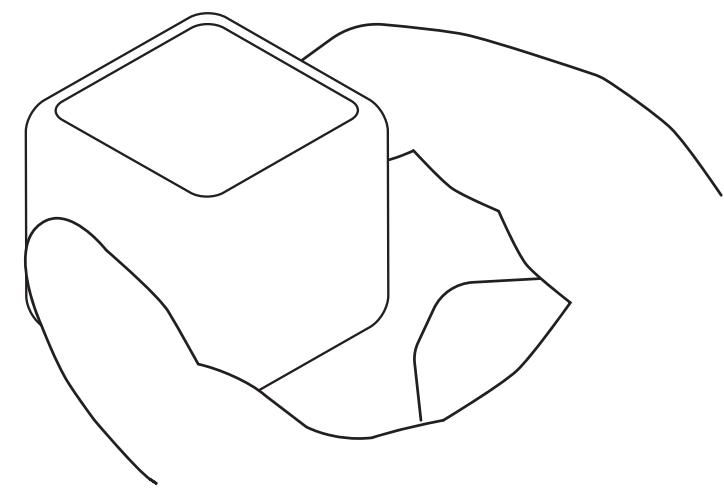
press

Pressing or squeezing any face or combination of faces is reserved for any discrete change or action to the block.

press-and-hold
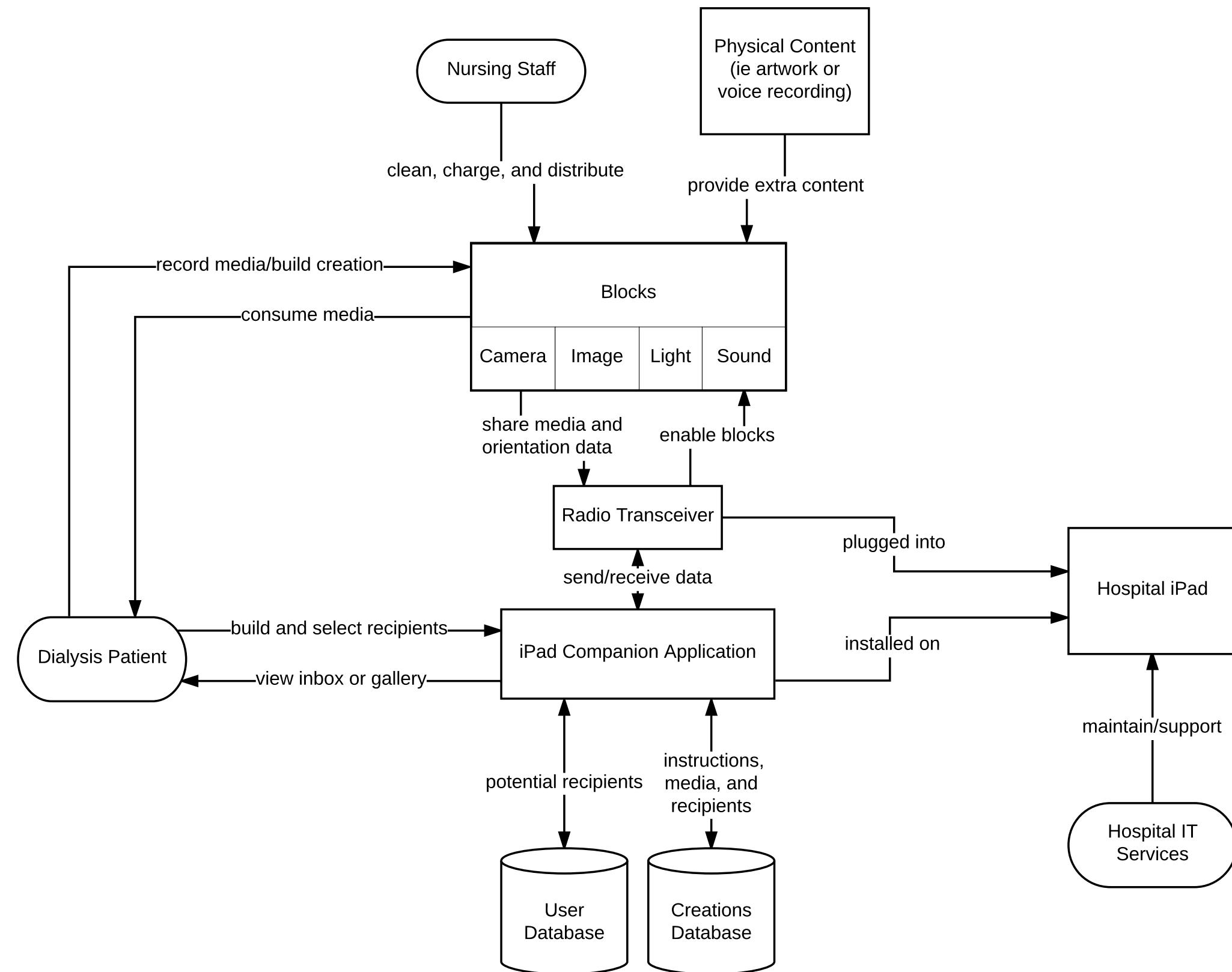
Pressing or squeezing for an extended period of time on any face or combination of faces is reserved for any continuous change or long term action to the block.

shake
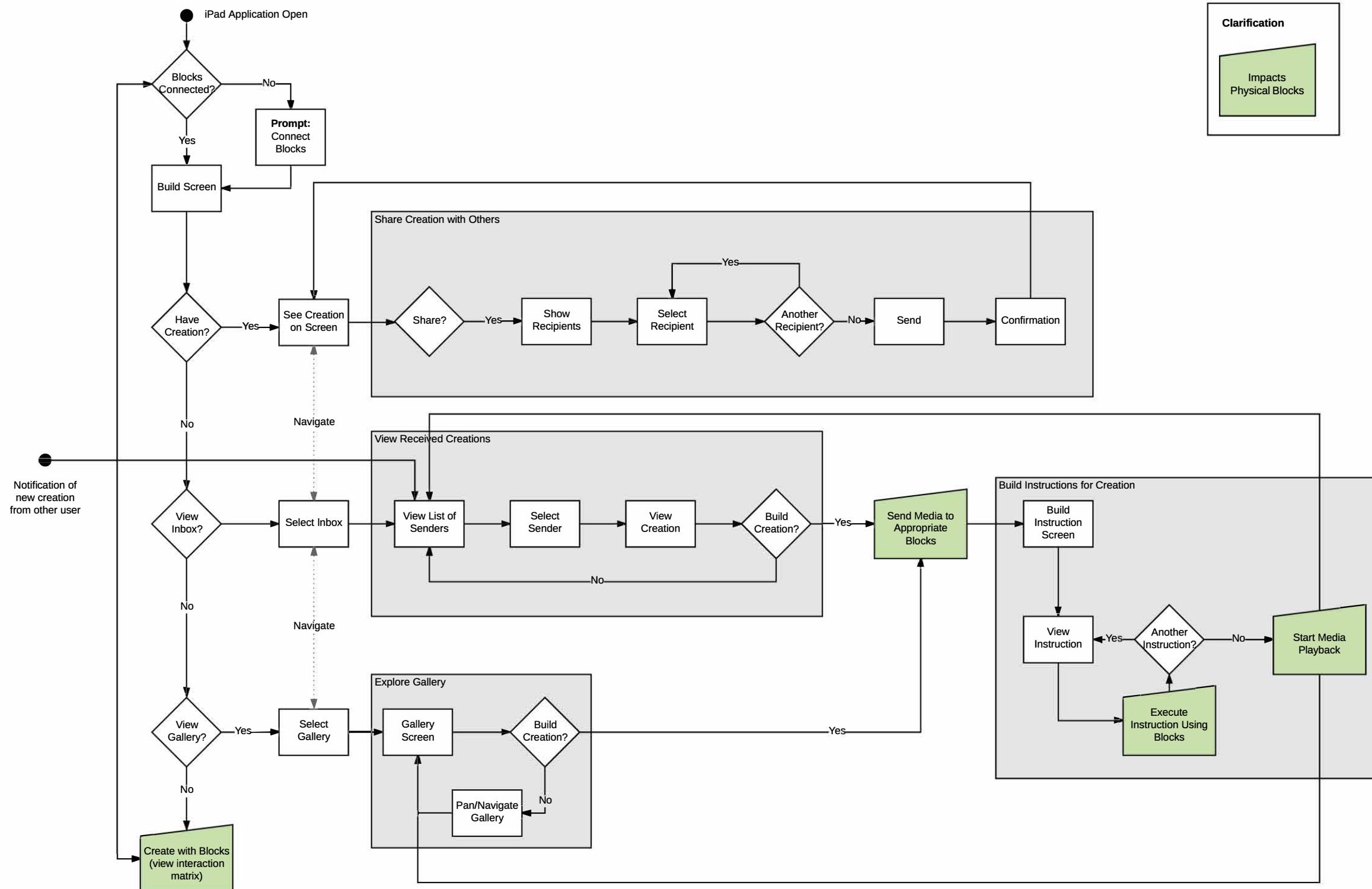
Shaking a block removes the content stored on that block or resets the block to a default state.

context diagram

Nursing Staff

Physical Content
(ie artwork or
voice recording)

clean, charge, and distribute

provide extra content

record media/build creation →

consume media →

Blocks

Camera	Image	Light	Sound

share media and
orientation data

enable blocks

Radio Transceiver

send/receive data

plugged into →

Dialysis Patient

build and select recipients →

iPad Companion Application

installed on →

Hospital iPad

← view inbox or gallery

maintain/support

potential recipients

instructions,
media, and
recipients

User
Database

Creations
Database

Hospital IT
Services

interaction diagram
main userflow

Clarification

Impacts Physical Blocks

● iPad Application Open

Blocks Connected? —No→ **Prompt:** Connect Blocks

Yes ↓

Build Screen

Have Creation? —Yes→ **See Creation on Screen**

No ↓

Navigate ↕

Share Creation with Others

Share? —Yes→ **Show Recipients** → **Select Recipient** → **Another Recipient?**
- Yes (loops back to Select Recipient)
- No→ **Send** → **Confirmation**

● Notification of new creation from other user

View Inbox? —→ **Select Inbox**

No ↓

Navigate ↕

View Received Creations

View List of Senders → **Select Sender** → **View Creation** → **Build Creation?**
- Yes→ **Send Media to Appropriate Blocks**
- No (loops back to View List of Senders)

Build Instructions for Creation

Build Instruction Screen ↓
View Instruction ←Yes— **Another Instruction?** —No→ **Start Media Playback**

Execute Instruction Using Blocks

View Gallery? —Yes→ **Select Gallery** →

Explore Gallery

Gallery Screen → **Build Creation?**
- Yes→ (to Send Media to Appropriate Blocks)
- No→ **Pan/Navigate Gallery** (loops back to Gallery Screen)

No ↓

Create with Blocks (view interaction matrix)

wireflow
main userflow

Application Startup

Build View

Share

Select Recipients and Send

Sent Confirmation

Gallery View

Instruction View

- - - Piece-by-Piece - - -

Instruction View

Inbox View

Inbox 2 View

Instruction View

Piece -by- Piece

Instruction View

Note: This doesn't contain the completely revised interface mockups.