



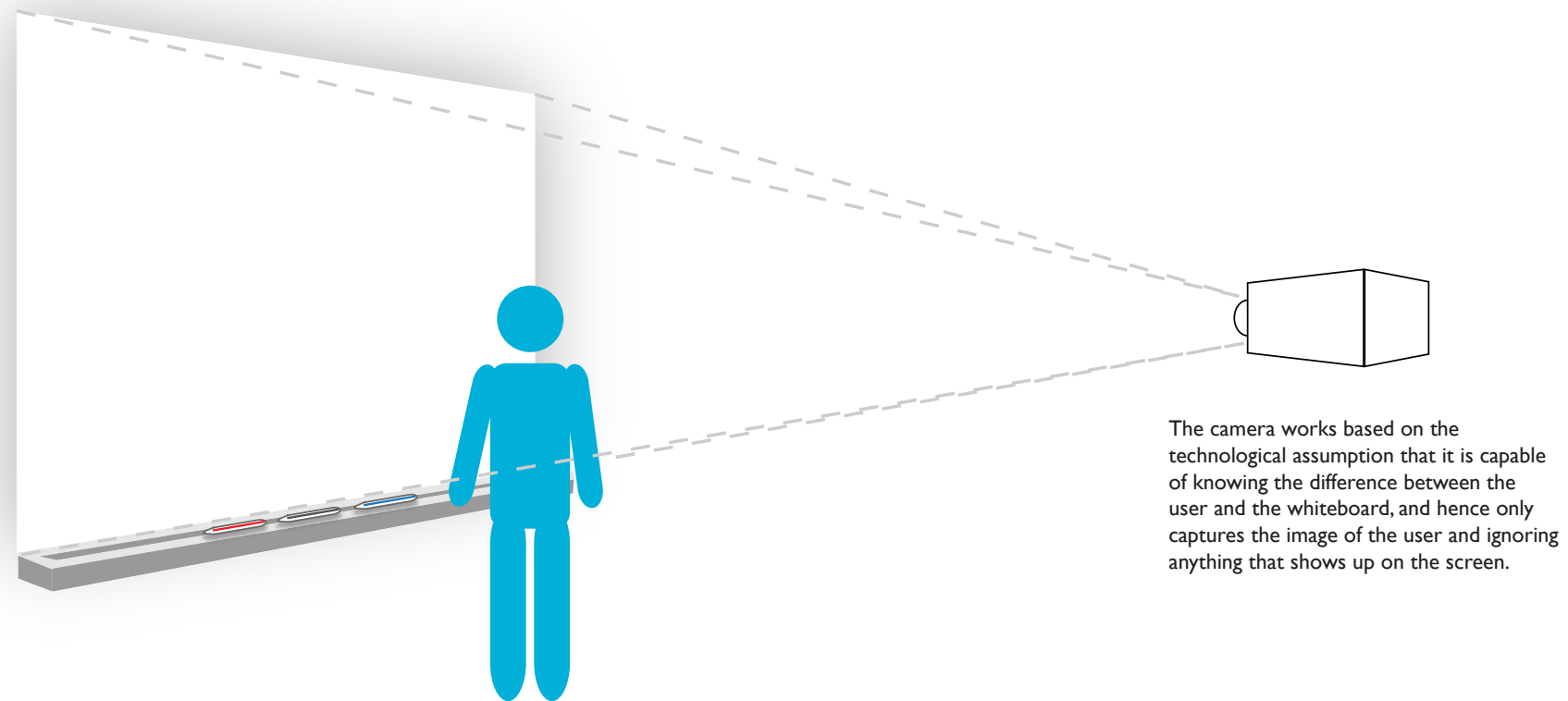
ONEBOARD
Digital Collaboration System

by Henry Liu
SFSU IxD Spring 2008



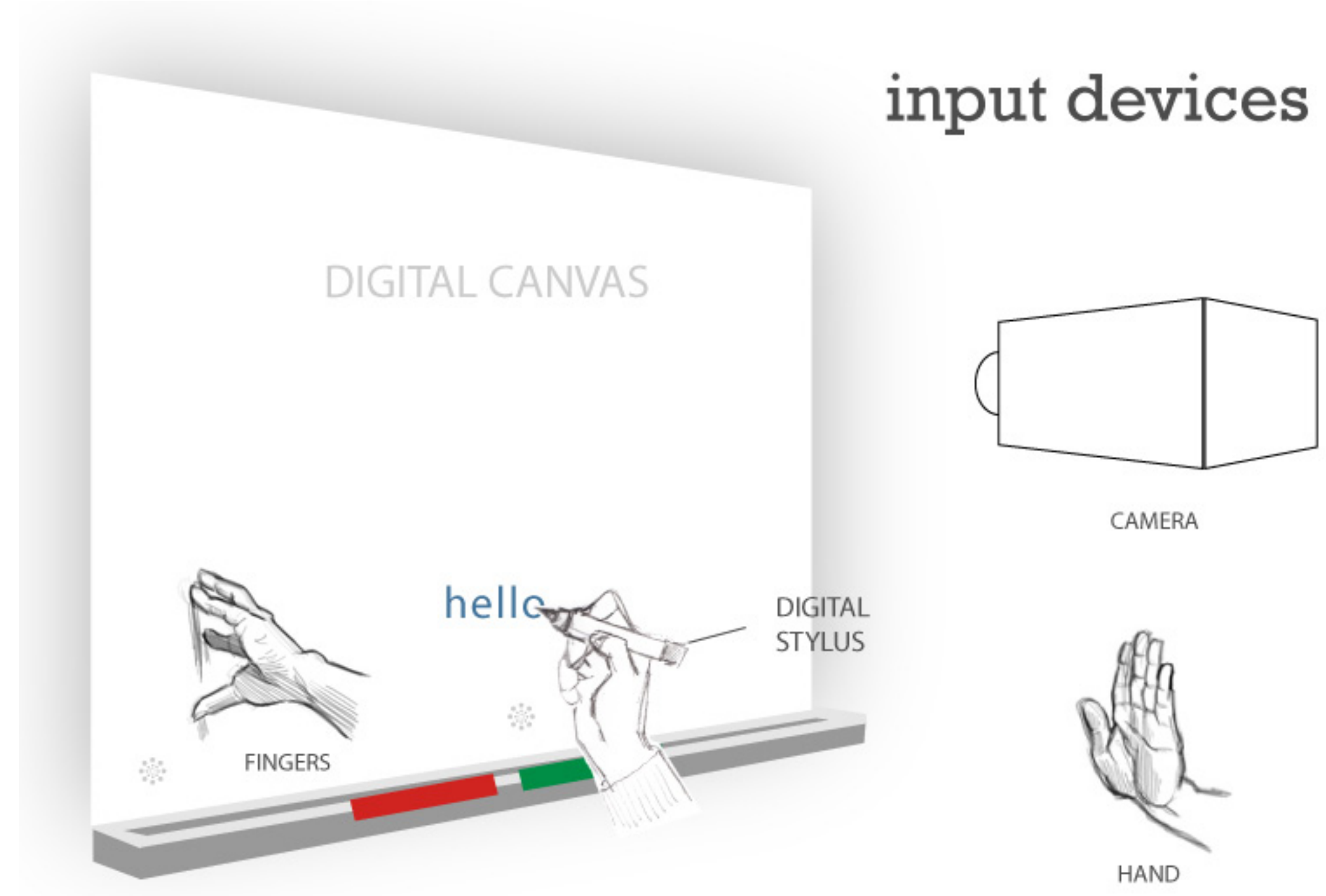
ONeBoard is an interactive whiteboard vsystem that combines the power of live video/audio conferencing, multi-touch technology, and cloud computing file management, into an online experience for use in classrooms, work offices, or any space where remote collaboration is most critical.

The Camera Captures the Image of the User



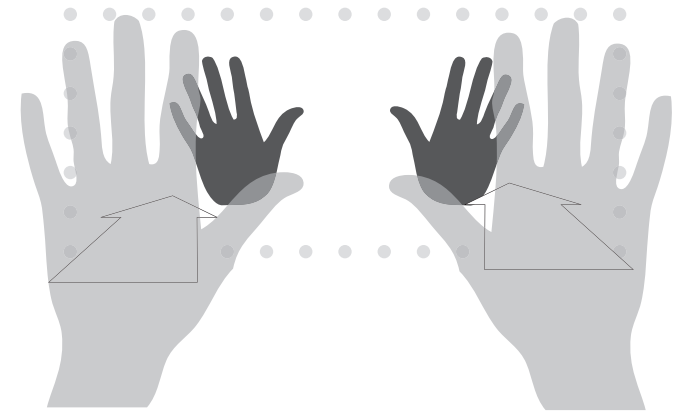
The camera works based on the technological assumption that it is capable of knowing the difference between the user and the whiteboard, and hence only captures the image of the user and ignoring anything that shows up on the screen.

Oneboard's collaborative features are based on the interplay of the touch-screen input, the projected imagery on the screen, the audio communication, and the camera capture device that grabs realtime video of the user as she uses her whiteboard. When set in a "collaborative mode" where two users are connected, the overall interactive experience resembles actually being there with the other user and sharing ONE board.



HELLO

“Place hands here to begin.”



Pre-“Login” Screen

The pre-login screen invites the user to interact with the touch screen to initiate the session. By placing their hands on the screen, the system loads the user’s personal data (if available) by scanning the user’s fingerprints,

If it was the user’s first time, the system captures and calibrates the user’s settings, creating a new “account” for the first-time user in the process.

If the user creates a new account, the system prompts the user to write their name with one of the stylus pens to complete the process.

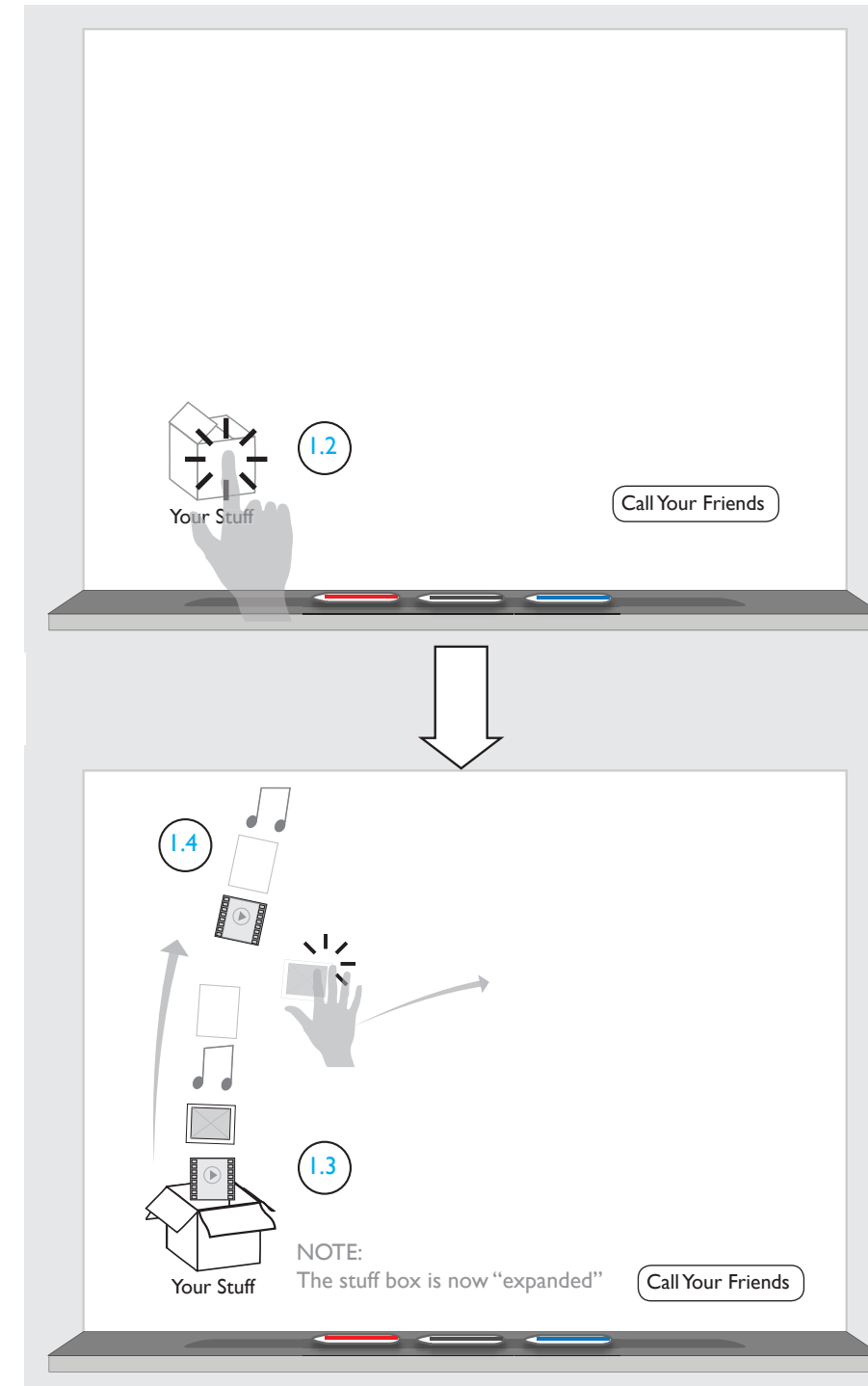
Post-“Login” Screen (Single User)

After “logging in” with their hands, the user is presented with a Heads Up Display of their data content, which is represented as a box of “stuff” (1.1) and various buttons. At this state, the user can either write on the white board with the stylus pen, browse their content, or connect with another user to start a shared session.

“Welcome Jim”



Call Your Friends



Browsing User Content

When the user wants to browse their own data (photos, documents, videos, etc), they simply open their box of stuff by physically clicking (1.2) on the box’s image projected onto the board.

Browsing User Content, Dragging

After clicking on the “stuff” box (1.3), the user is presented with their stored content (if available from previous sessions or from an import) (1.4). They can then drag items using a dragging gesture while pressing on a content item to manipulate (edit, zoom, rotate, share, etc) using multi-touch gestures.

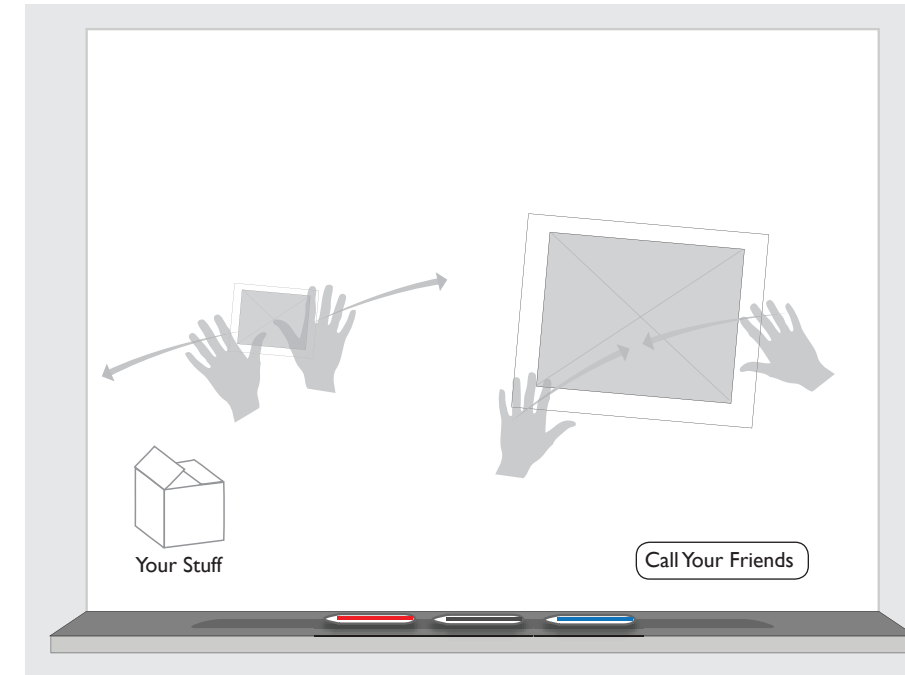
If there is more content than is viewable within the screen’s space, the user can use a flicking up and down gesture to “scroll” through their files. This “list view” can possibly be expanded to a “grid view.”



Writing/Drawing

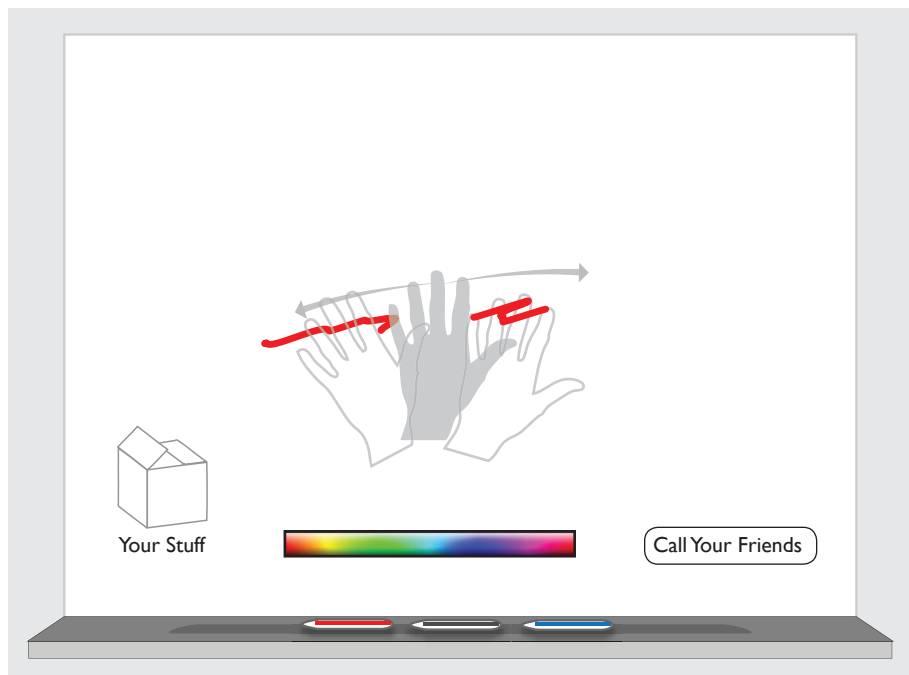
The user writes on the digital canvas with their stylus “pens.” (2.1) The device reflects the changes on the screen as if it were a real whiteboard. The user can select from a wide spectrum of colors in the palette which pops up when the pen recognizes that it is being used.

Writing can be used at anytime to make annotations on the screen.



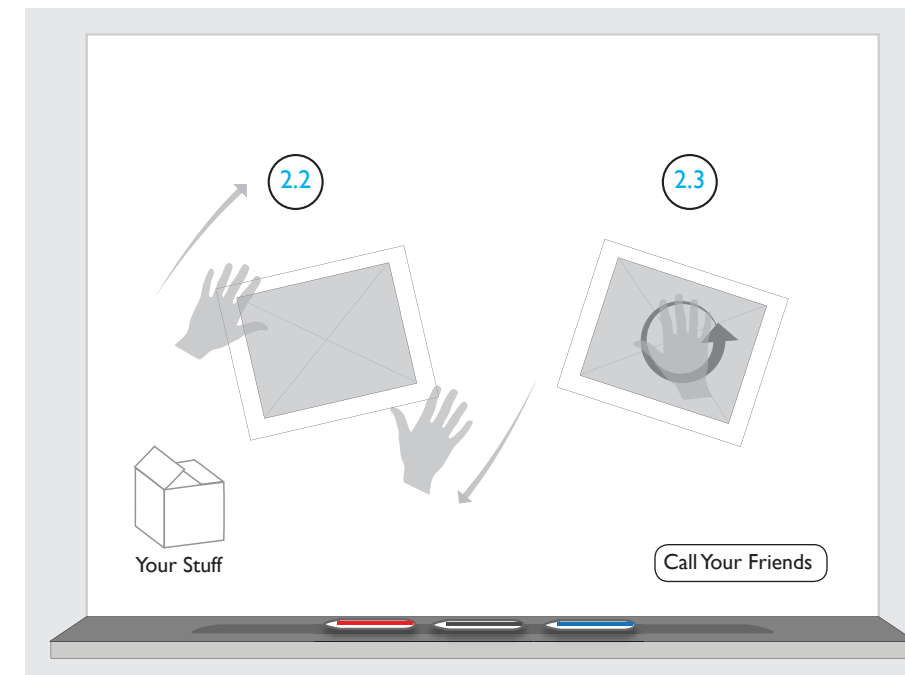
Manipulating Content, Zooming

Zoom is accomplished by taking two hands and performing a “stretching” gesture. Shrinking is accomplished by “pinching” or “scrunching” the content.



Erasing

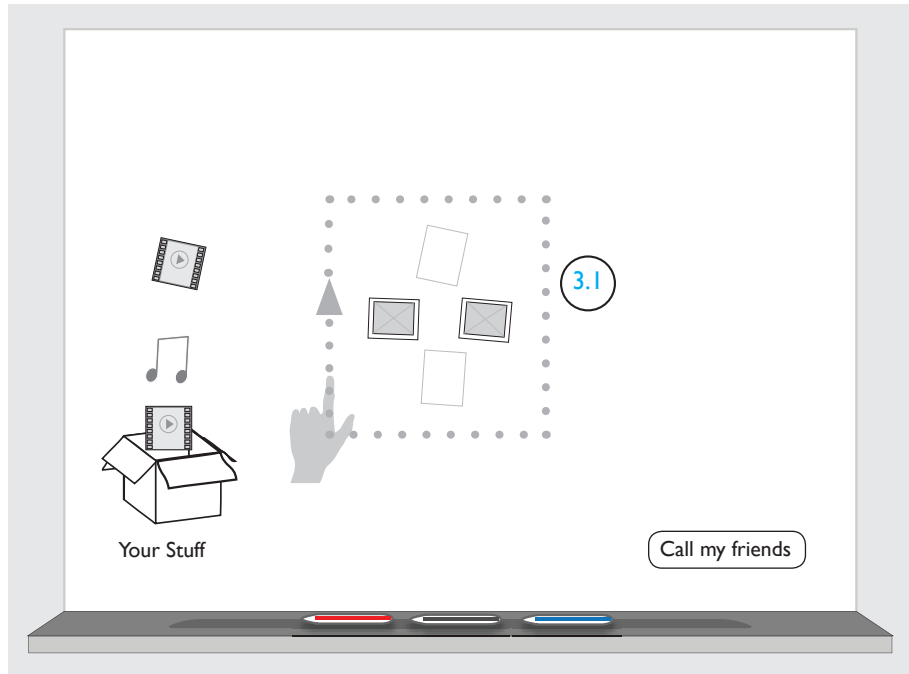
Erasing is achieved when the user makes an wiping back and forth gesture on the surface with their hands. The user uses multiple fingers and even their palms to perform this gesture, similar to erasing writing off of a dry erase board.



Manipulating Content, Rotating

Rotation is achieved by taking two hands and placing them on the content (in this case, a photo) and making the hands go in opposite directions (2.2).

Rotations with one hand are achieved by making a twisting gesture. (2.3)

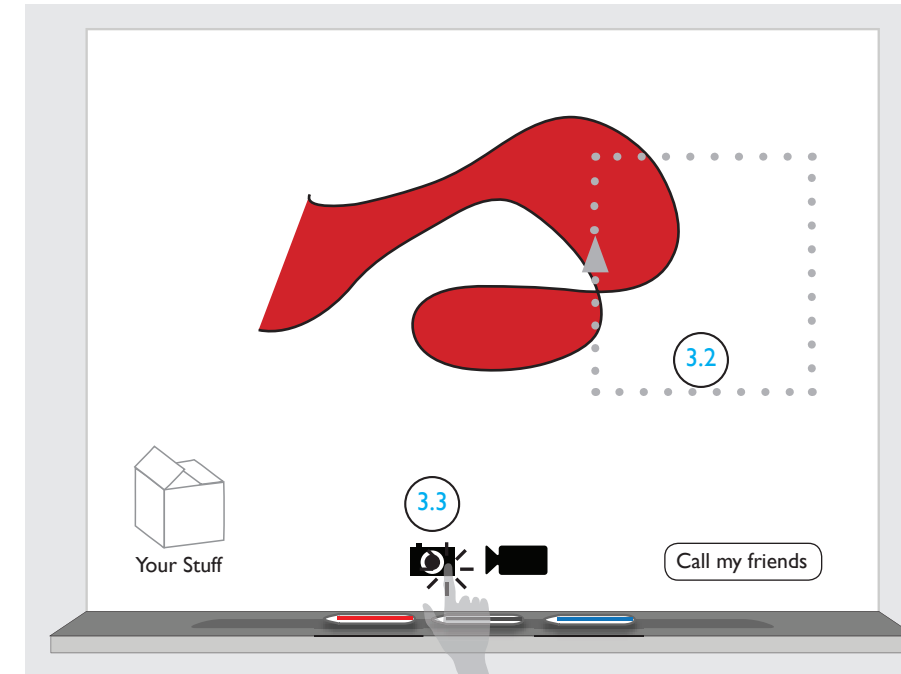


Manipulating Content, Selecting (Single User)

While the marker is used for writing, the user's off-hand can be used to select groups (3.1) of content for dragging, rotating, or scaling.

To achieve this gesture, the user simply takes a finger and draws an invisible box or loop around the items they want to select, similar to a marquee tool found in modern image editors. Once selected, the items are surrounded by a dotted outline.

To deselect, the user points outside of the dotted outlined area with their hand.

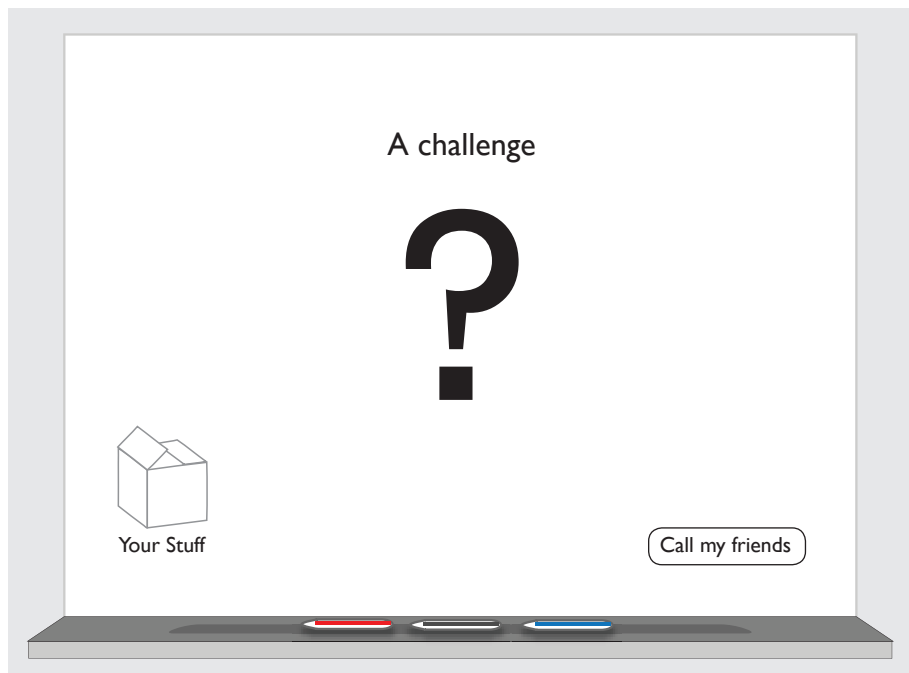


Capturing Content - Snapshot (Single User)

Capturing the content on the screen in the form of a snapshot can be achieved in two ways.

(3.2) The user can designate a capture "area" where a specific section of a board is selected for saving, such as a drawing/writing by CLICKING on the camera icon at the bottom of the HUD, and drawing a selection box with their fingertips.

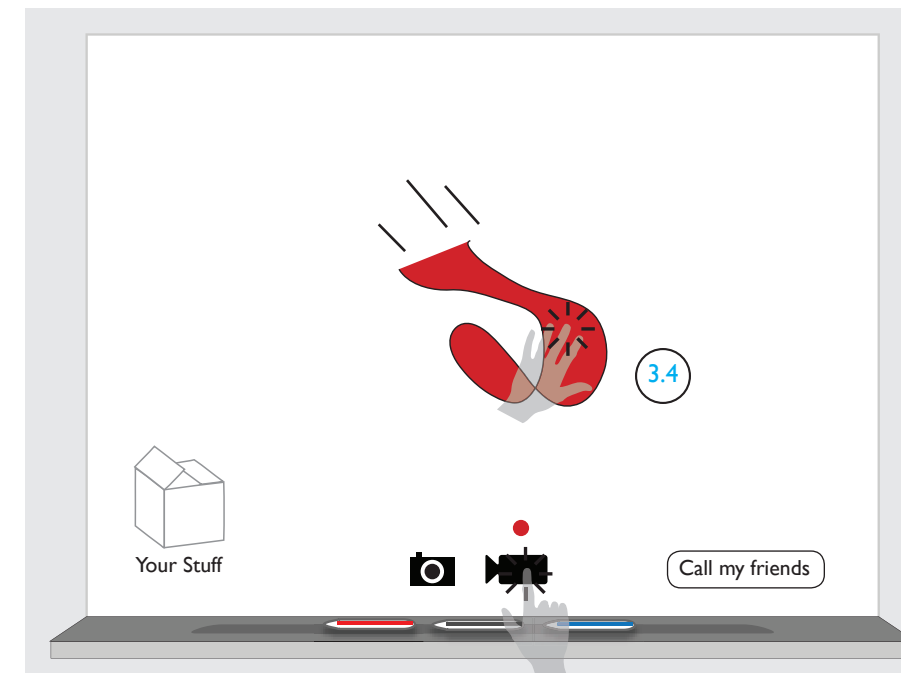
(3.3) The user can take a snapshot of the entire board's contents minus the Heads Up Display by HOLDING the camera icon.



Manipulating Content, Undo/Redo (Single User)

A common usage pattern of users who create, manipulate and delete content is the need for the ability to undo and redo actions as they are being performed.

Using gestures to achieve this particular action can be tricky. I have yet to figure out if an onscreen button would suffice for performing this action or if a gesture would prove feasible.



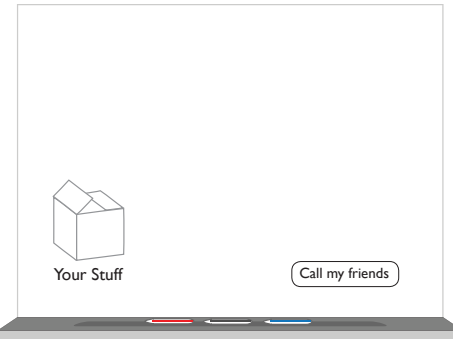
Capturing Content - Video (Single User)

Capturing content on the screen in the form of a video recording requires the user to click on the video camcorder icon. All the actions performed on screen (3.4), is recorded into a movie file and stored in the user's Stuff box.

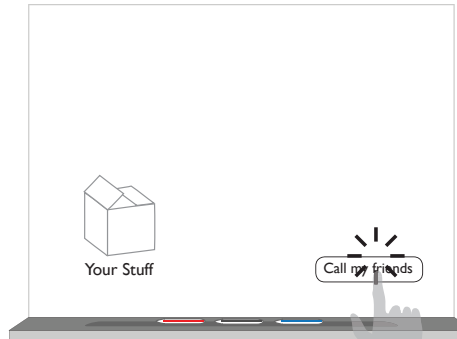
Similar to capturing a snapshot, the user can designate an area that they want to record video from by using the selection gesture around objects or anywhere of interest on the screen.

Storyboard - Connecting to Another User for Remote Collaboration

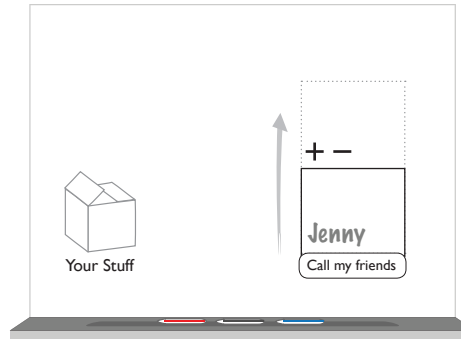
Connecting to Friends



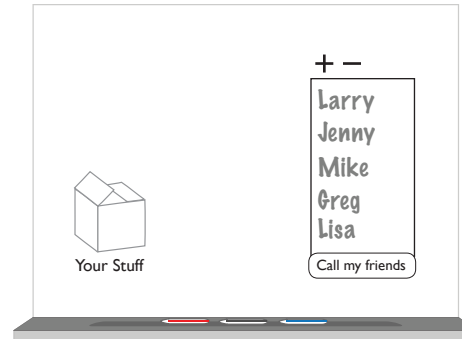
The home screen shows the “call my friends” button and the user’s “stuff box.” In this case, our local user is Jim, and he’s getting ready to connect to her friend Jenny for a multi-user session on the Oneboard.



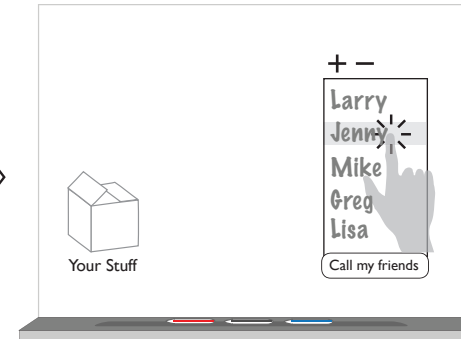
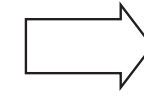
The user PRESSES the “Call my friends” button to bring up their list of friends that are online (using their own boards).



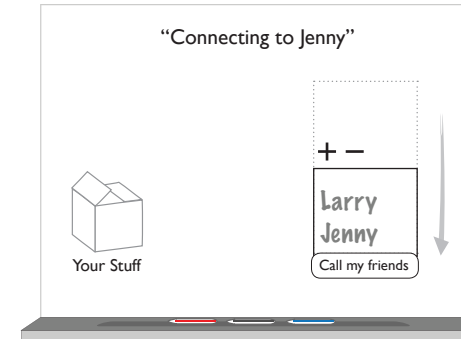
The friends list EXPANDS upwards to reveal all the friends that the user has added to the list, as well as the ones that are online.



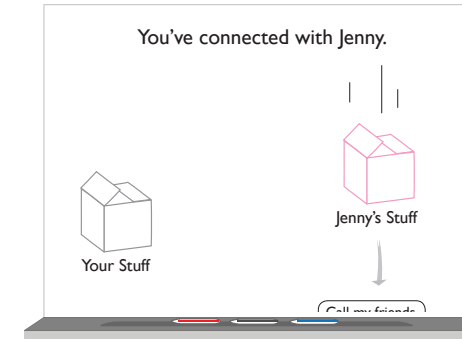
The friends that are online are shown in the list, and the user has the option of adding more friends and removing friends. This idiom is commonly used in instant messaging programs and video conferencing applications.



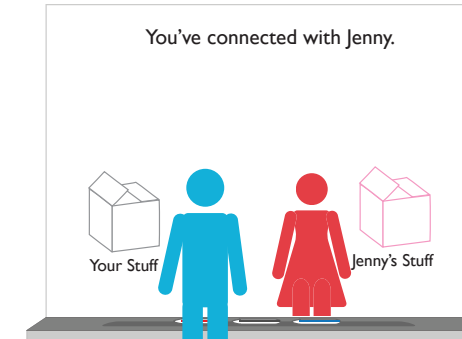
The user PRESSES on a name in the list of friends that are online and using their own personal boards.



Once connect, the call my friends list collapses.



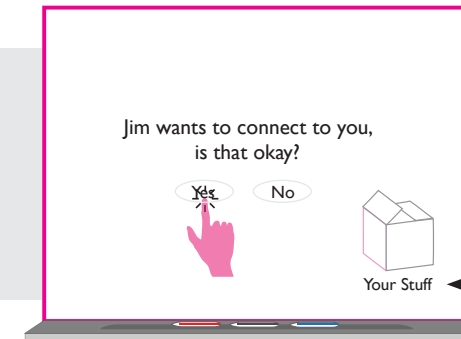
An image of Jenny’s box of stuff is “dropped” onto the Jim’s board, and the “Call My Friends” button hides away.



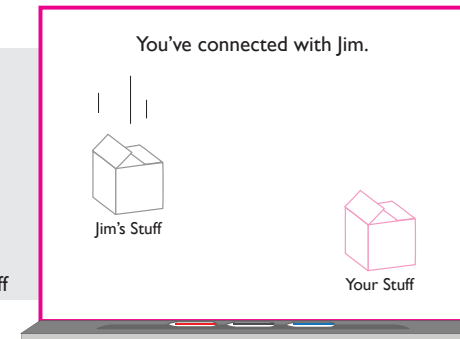
On Jim’s screen, Jenny’s physical image is projected onto the board semi-transparently.

Connecting to other co-users requires clicking on a “Call Your Friends” button, and selecting a friend from a list of friends. Essentially, this is like inviting someone to engage in online chat. This storyboard shows the process of connecting to another user.

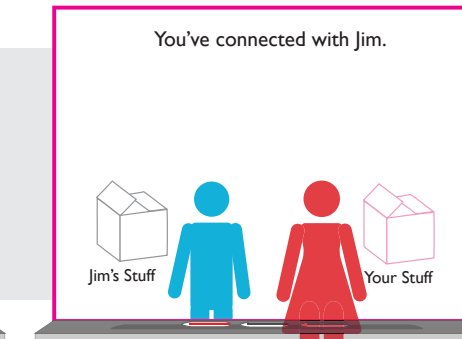
What’s seen on Jenny’s Board



What Jenny see’s on her board is a message that requests her permission to allow Jim to actually connect to her and start a multi-user session.

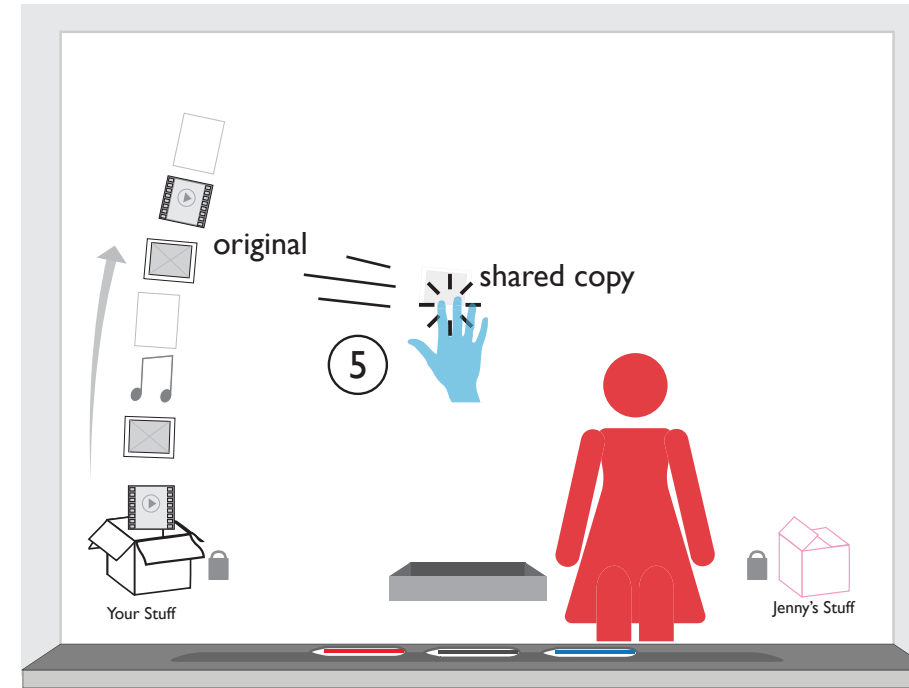
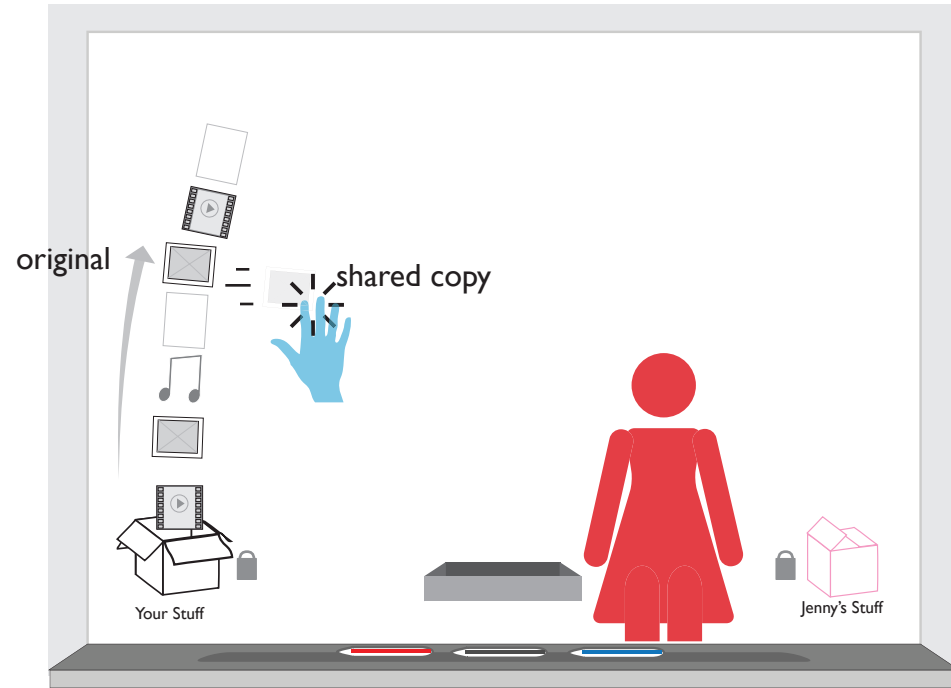
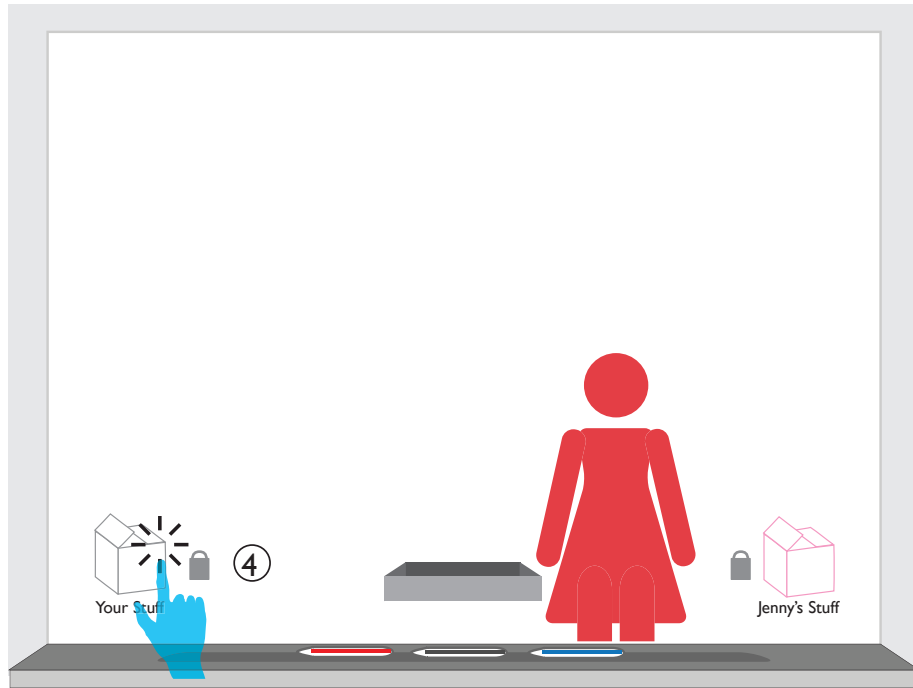


On Jenny’s board, Jim’s box drops onto the screen.



Jim’s physical image is projected onto the Jenny’s board semi-transparently.

Storyboard - Collaborating and Sharing Content : PART 1



Once connected, the two users are capable of manipulating each other's content based on a sharing system. Each user has sole permission to navigate through their own respective content. For example, Jim (blue hand) can only interact with his own box and Jenny may only interact with the contents of her own box. Jim isn't allowed to peruse through Jenny's stuff unless Jenny gives him permission by unlocking her box, and vice versa. Notice the lock icons next to each user's box. They both are in the locked position. If pressed, the box's contents are unlocked, and the opposite user can access the files within the unlocked box.

Anytime someone brings out an item from their box in multi-user mode, the content is made into a COPY of the ORIGINAL and placed onto the board's open space for sharing. With the users sharing a COPY, they can make as many edits, gesture manipulations, and annotations as they please during the collaborative session, without damaging the ORIGINAL. This ensures that no one loses their files during a collaborative session, and the functionality enables the creation of multiple VERSIONS for editing by either user. Since the file is shared between the two users, it is inherently unlocked and can be placed into a co-user's own box or into the "community box."

4



By introducing a locking system while in multi-user mode, each co-user's privacy is protected. Only the person owning the lock is able to access the boxes locked contents.



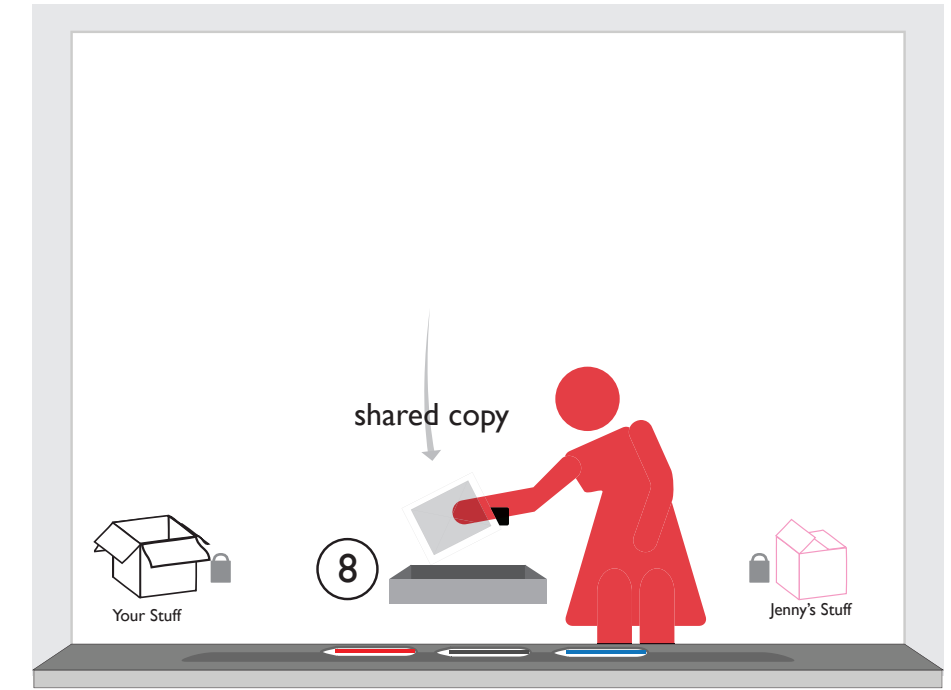
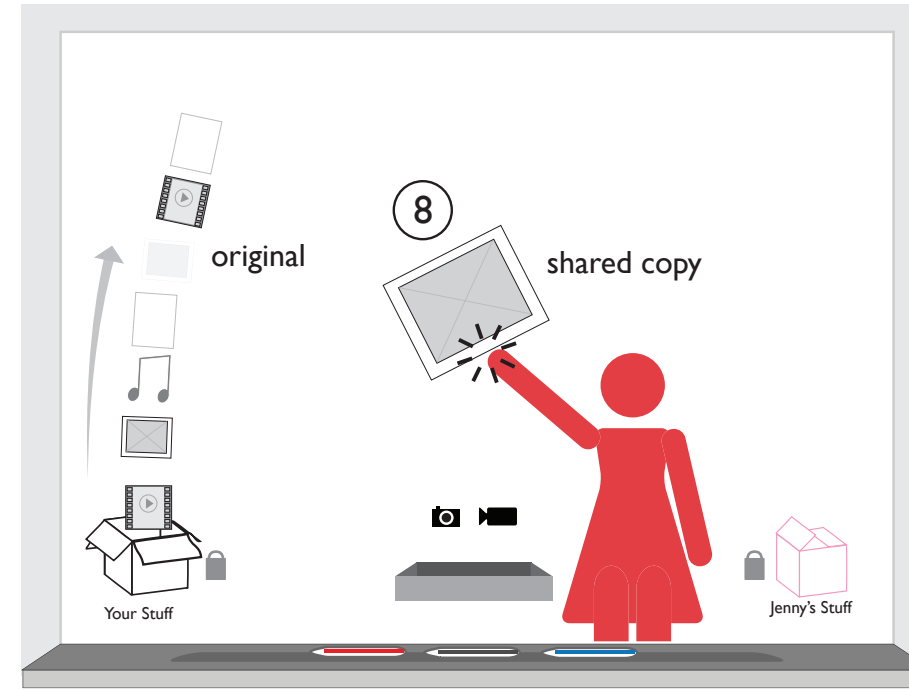
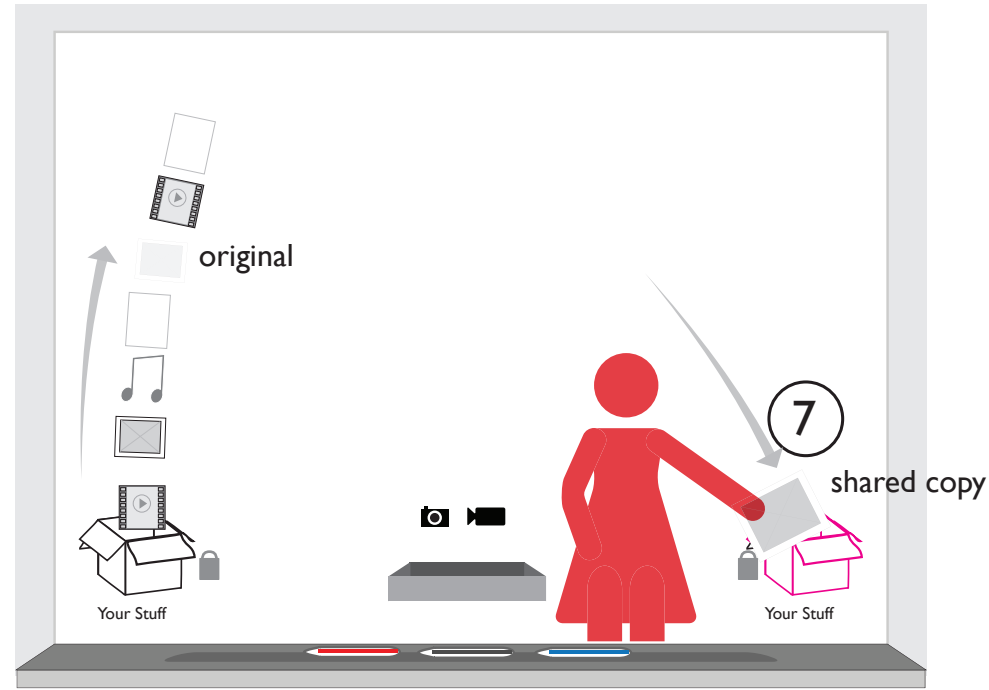
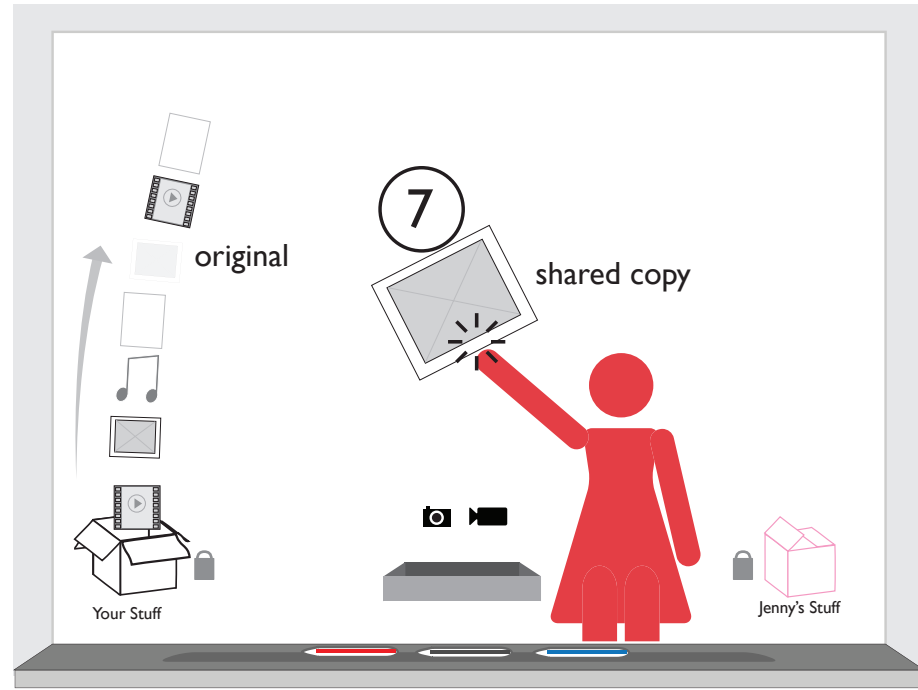
If unlocked, the lock owner is allowing free access to all the contents of their box.

5

Playing with a COPY allows the session to be productive without being destructive. To save the modified copies of the files, a community box is used to store the session's files.

6

The community box is the place to store session files that both users want to keep once the session has ended. The users can simply drag the community box into their own box and they'll have all the modified COPIES on their computer, or they can pick specific session files from the box for keeping.



7

The users are given the choice of either taking a shared session file and putting it into their own respective boxes, or placing them in the shared bin for saving later.

In addition to adding session files to the community box, the users can capture the entire screen or record video. These files will be placed in the community box automatically and like the other session files, can be dragged into either user's boxes for use later when not connected.



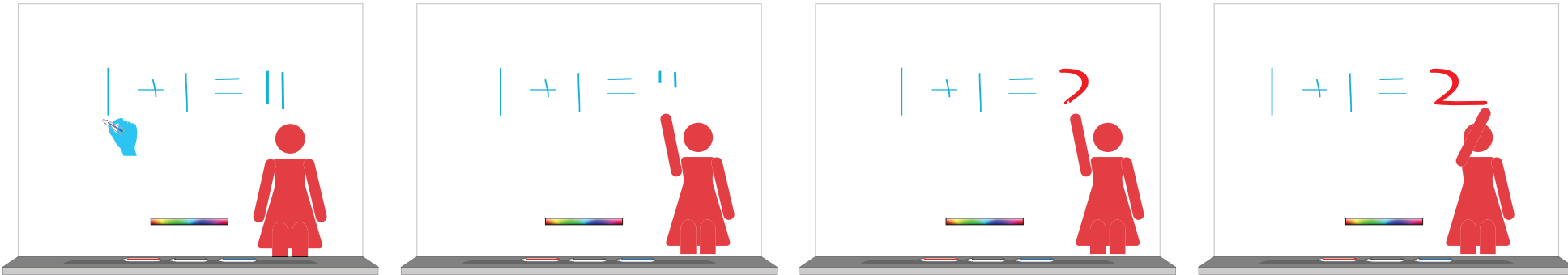
8

The shared bin or “community box” is useful for keeping files that were worked on collaboratively during the session. The contents can be copied onto either user's box, or it remains stored in memory for use when the two users connect again in the future.

How the community box is implemented is similar to the way Google Docs works. It may perhaps be hosted on a server somewhere such that they can be accessed from computers as well as the board.

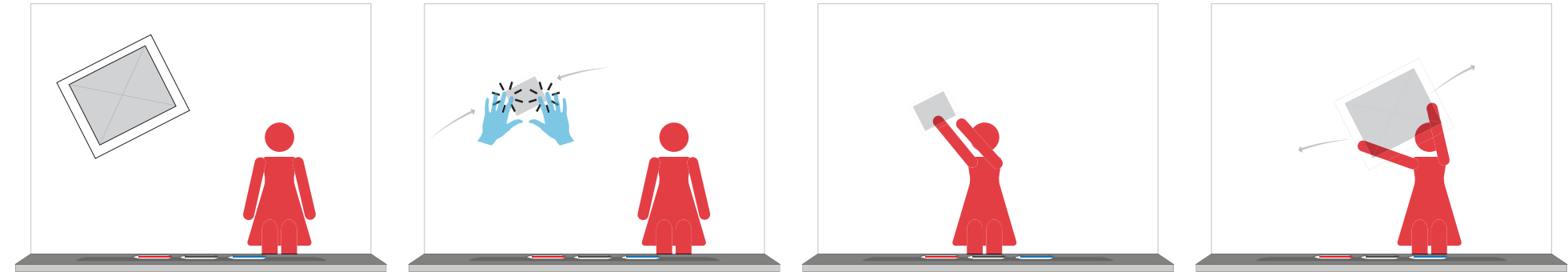
Storyboard - Collaborating and Sharing Content : PART 2

Collaborating: Writing and Editing



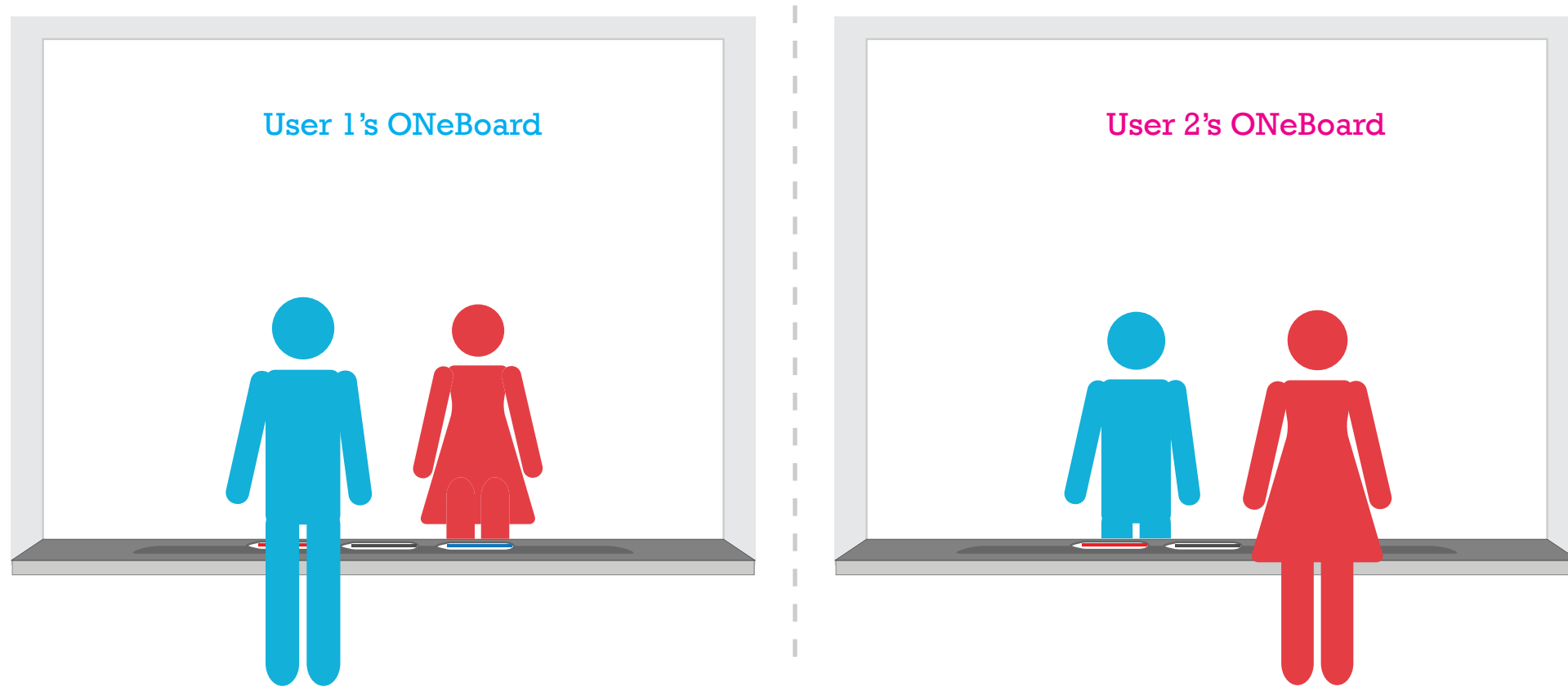
Writing and editing content is always live and in realtime, so there is no need to take turns. Whatever the one user writes, another can erase. The concept of locking can also be applied in this case if any user doesn't want the other co-user to erase their stuff.

Manipulating



In the same way that a single user manipulates their content, multiple users can interact with a session file using gestures. This allows for maximum interactivity between the users as they twist, turn, and play with their files to communicate ideas.

Let's break this communication barrier



In conclusion, the idea is quite simple – utilize all the benefits of touch screen technology, video conferencing, audio conferencing, and versioning systems like Google Docs, and incorporate it into an interactive and highly collaborative experience. The benefits of such a device can be enormous. Having the ability to communicate clearly past the overheads of traditional phones, web cameras, and instant messaging will allow us to connect remotely in ways never before seen. People can truly feel like they are together in the same room, at the same time.

I believe that such a device requires much more research time and investigation than what was allotted in my 6 weeks in this class. There are a few pitfalls in the interaction that need polishing and fine-tuning. Nonetheless, I believe the idea of the device itself is enough to get me excited about what we can do in the near future, and I look forward to dreaming up more such devices as I gain knowledge in the rich field of interaction design.

