

**Stories that Move**  
**Med Fi Prototype - HCI (INFO 6410)**  
**Team Members:** Brandon Plaster (*bp364*), Rohit Jain (*rj288*),  
Alap Parikh (*akp76*), Jonathan Huang (*jhh283*)

## **1. Introduction**

### **Title:**

Stories That Move

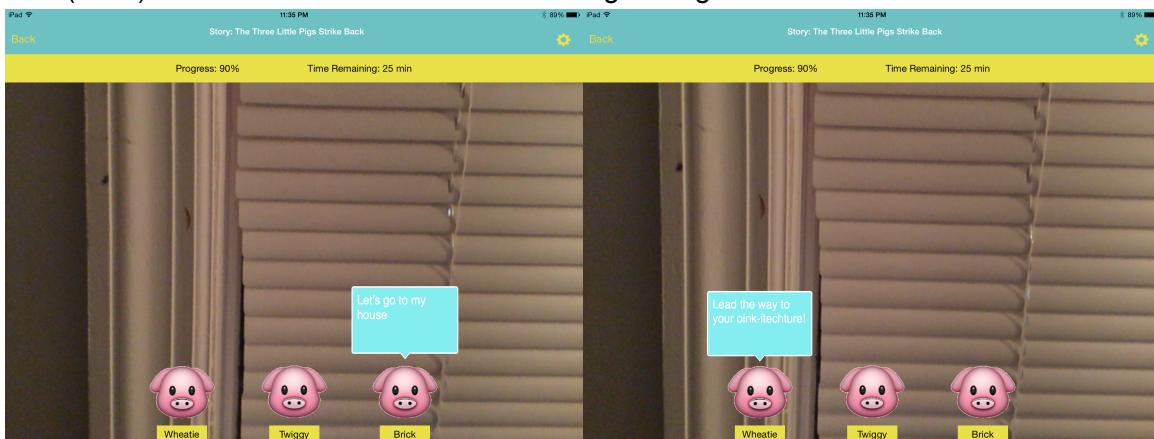
### **Problem and solution overview:**

Physical inactivity, common in 1 out of 4 adults, has been identified as the fourth leading risk factor for global mortality. Though often the scapegoat, connected digital platforms/devices cannot be blamed, as it is the applications created for them that define their utility. We propose that by adding physically-interactive storytelling, we can make digital technology the solution, rather than the problem. The proposal is to create an Augmented Reality (AR)-based story platform that will engage the user with a story, while simultaneously requiring the user to actively explore the physical world in order to move the story forward.

### **System Being Evaluated (Prototype Description):**

In order to prototype our system, we used two separate prototypes -- an application on an iPad and a proto.io demo (an extension to our original med-fi prototype). To see the rationale behind the split, see the “Purpose/Rationale” section. Specifically, each application had the following features / improvements.

**New iPad Application:** Self-developed iPad application to simulate an augmented reality viewport using the camera. The goal of this application is to model the interaction with on-screen non-player characters (NPC) as well as the interaction of “looking through” an iPad.

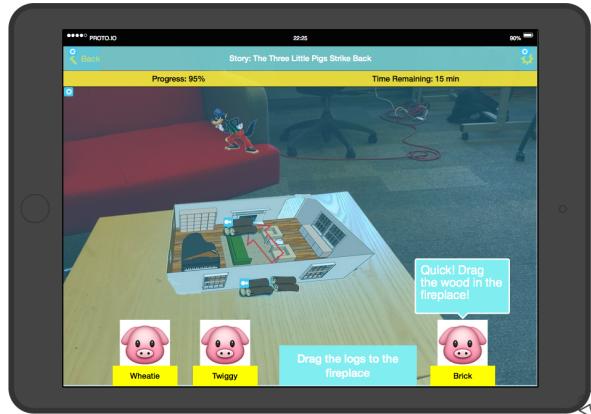


### **Proto.io Design Changes ([link](#)):**

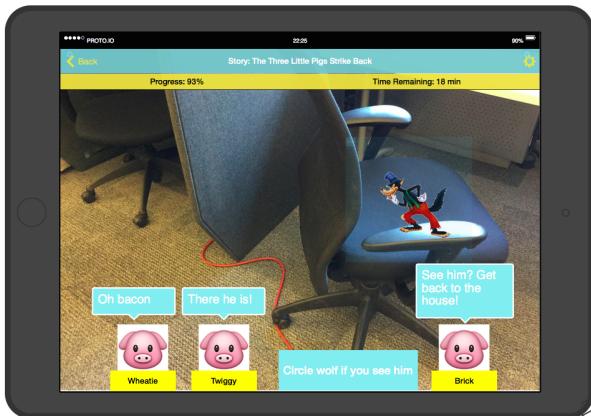
Building on our original med-fi prototype, we made the following interaction-level changes to our prototype to better model our proposed interface flow for potential testers.

- Task 3: Added an interactive surface to task three (dragging a log to the fireplace). Instead of being triggered by a touch of the screen, the event now triggers when logs are actually dragged to the on-screen fireplace.

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- Task 2/3: We've updated the interaction to highlight and identify the wolf to only be triggered on actually "circling" the on-screen wolf. Simply tapping the wolf will not trigger the expected event.



- Task 2: To simulate the "choose-your-own" story aspect of our application (and how user choices influence the progress of the story), we added an interaction where "looking" (press and hold arrow) in different directions will play different videos (simulating looking around) and will trigger different outcomes where only one direction will make the story move forward.



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In addition to these interface level changes, we also updated some of the in-prototype instructions to fit the expectations for our experiment (for example - the instructions to trigger a “knowledge acquisition” video transition is now specified as a “press and hold” action on screen).

**Purpose / Rationale of Experiment:**

The necessity for splitting up the prototype into two interfaces was to allow access to the camera (for the traversal and knowledge acquisition tasks), while preserving the fidelity and rapid-prototyping nature of the already-designed proto.io prototype. Due to the visual feedback inherent in the application, we determined it necessary to experiment with a live camera feed that the user would use to navigate, which is not available with proto.io. In order to ease the transition between prototypes for users, we replicated the overarching design onto the iPad and gave time between each task to emphasize the split between the tasks.

The purpose of the experiment using the iPad interface was to gain an understanding of how users felt navigating an environment through the lens of a tablet (and whether the expectation to have users navigate this way is feasible). This feedback helps us understand what level of comfort users have looking through the iPad while walking through, searching, and viewing a physical environment.

The purpose of the experiment using the Proto.io interface was to gain an understanding of how users felt interacting with perceived “augmented” elements and with how users felt using a set of written instructions given by the platform.

## **2. Method**

**Participants:**

Our solution attempts at combining reading, and exercising hence our target customers were people who like to read and in general aren't able to find the time to exercise. Once we identified a target user we introduced them to the idea and asked if they would be interested to try out the application. The participation was completely voluntary and solely based on users interest and willingness to try out our platform. No form of tangible compensation was provided.

The participants were all in the age group of 20-30, 3 males and 2 females. They spent most of their day sitting and doing a desk job (software engineering professionals). All participants had graduate level education and a lot of experience using smartphone and computers in daily life but little or no experience with the iPad itself. The iPad and iPhone have similar functionalities so the learning barrier was not very high but the form factor in itself is very different. In terms of prior experience with specific tasks details are as follows:

**“Traversal” :** Everyone had used a device (ipad, smartphone) camera before but not specifically to traverse their environment.

**“Knowledge Acquisition” :** Similar to task 1, the experience with looking at the environment from a device was limited to taking pictures/videos but not to search for some object in the real world.

**Stories that Move**  
**Med Fi Prototype - HCI (INFO 6410)**  
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**"Interaction"** : Everyone had experience with on screen interaction with digital objects, eg. drag & drop functionality for icons on the device using touch/trackpad interface.

**Apparatus:**

Both of the interfaces (application interface and proto.io interface) were presented on an iPad. Initially proto.io was presented on a laptop but eventually it was also moved to the iPad. The iPad used was an iPad Air with the dimensions 9.4 x 6.6 x 0.24 inches and weighed about 1 pound. For looking at the environment, its rear camera was used, which is 8MP. The tests were done in a semi-crowded space indoors, so that we could replicate the home & office environment. We had enough space to change the obstacle course as needed and to allow the users to move around freely.

**Tasks:**

-     ***"Traversal"***

**Description:** Users will need to traverse the physical environment while using the interface. The stories will be segmented into multiple locations, or waypoints, and the user will need to physically move to get to the locations (in this case the pig's house) to move the story forward.

**What we looked for:** The primary focus of this test was to see how users felt about navigating the environment while looking through the iPad's camera. We watched for any difficulties users had with navigating, how much they used the iPad to navigate vs. how much they looked away from the screen, and how long users were willing to hold up the iPad for viewing.

-     ***"Knowledge Acquisition"***

**Description:** In order for users to gain more information about the story and make progress users will need to use context clues to extract information (following on-screen directions and prompts). This may require the user to look around, listen to dialog, and recall previous parts of the story.

**What we looked for:** The primary focus of this test was to see how users felt about looking around the environment through the iPad's camera in search of elements in the story. We watched for how long it took users to find the element (in this case, a hidden picture of the wolf), what their natural motions and instincts were for looking, and any issues they had when searching the environment through the iPad.

-     ***"Interaction"***

**Description:** Users will need to manipulate and interact with items in their environment (such as moving objects from one location to another [e.g. logs]).

**What we looked for:** The primary focus of this test was to see users felt about interacting with the perceived "augmented" elements through using the touch interface of the iPad. We watched for how

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**Med Fi Prototype - HCI (INFO 6410)**  
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long it took to complete an interaction task, how easy it was for the users to follow the on-screen instructions, and how easy it was for them to interact with the on-screen elements.

**Procedure:**

The user was introduced to the interfaces and given a narrative about the context of the application (details can be found in the demo script). The user was given a very brief demo of the interface (e.g. We told the user that they could tap on the pig on the screen for the instructions) which did not give any information on how to do the actual task itself. The user was then provided with the goal for each task. The procedure for each task is as follows:

***“Traversal”*** - The instructor gave context by explaining the current progress in the story. He told the user the location they are supposed to reach in order to finish the task but did not reveal information about the obstacle course. The destination had an image of the pig’s house displayed on a laptop. The user was to look through the camera lens for obstacles while moving around and choosing their own path to reach the destination. Once user reached the destination by dodging the obstacles using the application, the task was considered successfully completed.

***“Knowledge Acquisition”*** - The instructor provided context about the progress in the story and explained to the user that he/she had the freedom to rotate in any direction to look for the ‘wolf character’ through the iPad. We placed a printed picture of a wolf cartoon (to simulate the augmented reality wolf) somewhere around the user in such a way that they could find it by simply rotating. The user was provided with no information on the appearance of the wolf character. Once the user found the wolf through the application, the task was considered successfully completed.

***“Interaction”***- The instructor asked the user to follow the instructions on the screen and to complete the associated goals. Once the user successfully did the interaction specified, the screen progressed to the next interaction. The first action required was for the user to locate the wolf on the screen and then to circle the wolf. Once completed, the screen changed to a view of a house and gave the user the next set of instructions. The second action required of the user was to locate the logs on the screen and drag them to the fireplace. Once the user completed both interactions, the task was considered complete.

### **3. Test Measures**

As suggested in the assignment, we focused on qualitative measurements for this experiment. We urged users to speak freely and out-loud while executing the tasks and recorded whatever feedback they had to share. Specifically we wanted to capture any voiced difficulties and concerns that the users had while using the application interfaces. Each of these comments has a corresponding timestamp (see Appendix) which refers to the time in the interview recording. Because the goal of this experiment was to gain feedback on how users perceive the fundamental tasks that make up our

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interface, we felt that every bit of qualitative feedback (and any responses / problems that users ran into) was relevant to our overall design.

To capture more quantitative metrics, we also recorded times that testers needed to complete actions and asked testers to quantify and rate parts of their experience/projected willingness to use the product. Specifically we recorded the following:

- Task 1 Time - How long did it take to navigate to the “house” and complete the task
- Task 1 Mistakes - How many times the user stumbled or tripped on an obstacle
- Task 1 Rating - How long the user could imagine he/she using the device in one sitting
- Task 1 Attention - What percentage of the task was spent looking on screen vs. off screen
- Task 2 Time - How long did it take to complete the task and find the wolf?
- Task 2 Mistakes
- Task 3 Time - How long did it take to complete the entire task
- Task 3 Time pt 1 - How long did it take to read the directions and circle the wolf
- Task 3 Time pt 2 - How long did it take to find and drag the logs into the fireplace
- Task 3 Mistakes

These metrics were captured to gauge and quantify the comments that users voiced. We wanted to see how long users spent completing each task (time), see how difficult each task was (mistakes made), and wanted to see how different tasks compared with each other in “difficulty” (by comparing the time difference between tasks -- for example in the case of task 3 pt 1 vs task 3 pt 2).

## **4. Results**

For Task 1, the primary focus was understanding how the users felt about navigating through the environment using the lens of the iPad. When asked about navigation, 5/5 users stated that they initially worried about tripping over things and had issues with depth perception and 3/5 users stumbled slightly at least one time when first acclimating. For 4/5 users, it took less than 20 seconds for them to acclimate to navigation, and the 5th user was unable to acclimate. 2/5 users also shared the opinion that an iPad is better than an iPhone for this application because of the form factor allowing for a wider field of view and interaction space. It was assumed that there would be an acclimation period to using the application, so the short acclimation time reported was positive.

In regards to fatigue, users were asked to estimate the total amount of time they would be willing to use such an application, which resulted in 3/5 users stating that they would only be willing to use the interface for less than 10 minutes, one user being unsure, and one user stating that it depended on how focused they were on the story. Each user had a distinct way of holding the iPad, one tended to face it towards the ground, one held it directly in front of them, and the other three held it about chest level. A worry is that users will fatigue from holding up the iPad for extended periods of time, which aligns with these findings, though actual stamina tests would be needed to be conclusive.

**Stories that Move**  
**Med Fi Prototype - HCI (INFO 6410)**  
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In regards to attention, 5/5 users stated that 80% (or more) of their attention was focused on the iPad during their interaction. Until they acclimated, this inhibited their ability to move. As a result of unclear instructions, 3/5 people were expecting actual augmented items, which resulted in initial confusion in the instructions that appeared on the interface. This high estimate for focus on the screen may be a symptom of the application being new for the user, or it may be resultant from there not being a continuous interaction with the device. Regardless, this result sheds light on what users will experience when initially engaging in the system.

For Task 2, the primary focus was understanding how the users felt about searching the environment through the lens of the iPad. Due to limitations in the prototype, 2/5 users accidentally found the physical wolf before they saw it through the iPad as a result of their peripheral vision. Due to their worry about missing something on the interface when turning, 3/5 users felt they needed to move slower when searching for “augmented” items. One user even felt “car sick” and disoriented after rotating. This differed from their walking movement, which was not inhibited by this worry. Also when searching, 4/5 users rotated while scanning at the same height first and then looked up and down, and only one user first scanned up and down and then rotated. When asked about this, one user stated that “[holding it] facing down makes me feel more removed”. This was an important observation, as it implies that the stories may need to take place more at eye level than on the ground.

For Task 3, the primary focus was understanding how the users felt about interacting with the “augmented” elements using the touch surface of the iPad. Only 2/5 users had issues with finding the elements on the screen with explanations such as “the wolf didn’t look like a wolf”, “the logs were too small”, and “I wasn’t initially sure of where the fireplace was.” The other three users had no issues completing the tasks, and regardless, all the users were eventually able to complete the task. When comparing the tasks, 5/5 people spent more time “circling the wolf” than “dragging logs”, and one user pointed out that the wolf was awkwardly placed in such a way that it was not quite close enough to the edge to be comfortably circled with the user’s thumb, and not quite far enough away from the edge to justify the user using their pointer finger. Also, 4/5 users complained that the interface contained too much text and it was initially unclear which were the tasks, and which were just dialog from the NPCs. These findings made it clear that an entirely text-based system needs to be used with caution, and that exploration of an additional auditory element could alleviate those pains.

## **5. Discussion**

### ***Changes to Experiment***

- **Depth perception (test a range of point of views, one-to-one vs. wider):** A majority of our testers required some time to acclimatize to looking at the world through an iPad. Participant 5 mentioned that a wide field of view through the iPad camera lens was useful since he was able to see more of the world on the screen. However, this could be a cause for disorientation (at

**Stories that Move**  
**Med Fi Prototype - HCI (INFO 6410)**  
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least initially) for other users, since depth perception is a critical piece of information that is lost by viewing the world on a 2d screen. One thing that we felt would be useful to test would be different fields of view, leading to different depth perceptions, and then judge which of these depth perceptions is found to be most comfortable by a majority of users.

- **Clear instructions to testers:** Quite often, we found that participants were somewhat confused by our instructions for the tasks. One such issue was whether there were actually going to be augmented reality objects that could be viewed through the screen. It would have been helpful to be more detailed and specific about what to expect and what not for each of the tasks, such that the participant could concentrate more on voicing their thoughts out and waste less time asking questions.
- **More quantifiable data:** Upon analyzing our tasks after completing testing, it would have been more helpful to have a few more agreed upon quantifiable criteria/tasks and then measured each one consistently for each participant. Maintaining a more comprehensive and clear list of such data points would make the post interview analysis easier. One example would be to have the same obstacles in the same locations for each of the participants in task 1.
- **Make all tasks longer and consistent between participants:** Sometimes a task would turn out to be more trivial than expected, and it was hard to prompt useful feedback from participants without prodding them with pointed questions. By making each task a little longer, more challenging, and consistent to the last detail, we can nudge participants into a more productive thought process. This also ties back into the example provided in the previous section about having the same obstacles in task 1.
- **Not switching between interfaces:** Since we used both a custom developed iPad app and the proto.io app, it would be better to have everything on one app. However, no participant mentioned this as an issue in their feedback.

#### **Changes to Interface**

- **Make dialogues less cluttered:** The variety of dialogues simultaneously presented on the screen was confusing for the participants, and their persistence meant clutter on the screen and more distraction from the task at hand. Our solution to this would be to have only one speech/dialogue bubble at a time, and have them pop up and appear temporarily one after the other. This would make things clearer and also convey more of a storytelling effect, which is what we were going for in the first place.
- **Make instructions more distinct:** Occasionally our interface prototype carries instructions in addition to dialogues on the screen, which currently is the same font type and color as the aforementioned dialogues. Judging by some of the feedback, it would be useful to distinguish these different kinds of text on the screen visually, either by changing the font properties or the highlight color.
- **Mixed reactions about visibility of objects on screen:** A similar piece of feedback was to make the interaction objects clearer on the screen. Hence in task 3, when the logs had to be dragged to the fireplace, a couple of participants felt that the logs were a tad small, and

## **Stories that Move**

### **Med Fi Prototype - HCI (INFO 6410)**

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Alap Parikh (*akp76*), Jonathan Huang (*jhh283*)

another participant had trouble locating the fireplace. Not all participants had this problem. To have a balanced solution, the objects relevant in every task to be completed can be subtly highlighted by having a white border, or similar.

**Stories that Move**  
**Med Fi Prototype - HCI (INFO 6410)**  
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Alap Parikh (*akp76*), Jonathan Huang (*jhh283*)

## **6. Appendix**

### **Materials**

#### **- Demo Script:**

This project is exploring the feasibility of an Augmented Reality (AR)-based story platform we are in the process of designing. The end goal is for users to engage with a story, while simultaneously be asked to actively explore the physical world in order to move the story forward.

Today, you (the tester) are being asked to test our prototype. Specifically we'd like you to complete three tasks (using only the background instructions provided at each stage). In order to give you some context, we are presenting the application in two parts (interfaces) -- one which conveys the usage and feel of the application (Camera Interface) and another that focuses more on on-screen interactions (Interaction Interface).

The Camera interface will test your comfort with moving about while looking through an iPad screen, whereas the Interaction Interface aims to test the intuitiveness of the prototype design.

Please think aloud as you are using the app. Any thoughts and feedback will be used and helpful in our study.

#### **- Instructions:**

**Task #1 Traversal** - Users will need to traverse the physical environment while using the interface. This task is required to progress the story forward and to see other parts of the story.

**Goal:** Using the interface specified, complete the following physical tasks (as dictated and instructed by your experimenter) while holding and "looking through" the camera interface.

- Walk around the room
- Navigate from start to end using the camera interface

**Interface Used:** Camera Interface

**Task #2 Knowledge Acquisition** - In order for users to gain more information about the story and to help the characters progress through the story, users will need to listen to and watch the characters interact with the environment, and will need to use context clues to extract information (following on-screen directions and prompts).

**Goal:** Using the camera interface, engage with your surroundings to locate the objects specified by the on-screen prompts and the researcher. This typically includes:

- "wolf" character

**Interface Used:** Camera Interface

**Task #3 Interaction** - Users will need to manipulate and interact with items in the virtual environment (such as moving objects from one location to another [e.g. logs]).

**Stories that Move**  
**Med Fi Prototype - HCI (INFO 6410)**  
**Team Members:** Brandon Plaster (bp364), Rohit Jain (rj288),  
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**Goal:** Manipulate the objects in virtual environment according to the instructions provided on screen.

**Interface Used:** Application Prototype

- *Follow Up Questions:*

- How natural did you find the traversal process?
- How often / how long do you think you'd be able to use the interface?
- How split was your attention between the real and screen?
- How tiresome did you find holding the screen?
- Were you able to easily locate the objects as dictated?
- How was the on-screen navigation? What was confusing?

- *Waiver*

[https://docs.google.com/a/cornell.edu/document/d/11khPw\\_M7dE3G77Q9O4S9HsxF9mlI4aNcQh4L3WBQyCY/edit?usp=sharing](https://docs.google.com/a/cornell.edu/document/d/11khPw_M7dE3G77Q9O4S9HsxF9mlI4aNcQh4L3WBQyCY/edit?usp=sharing)

**Raw Data (timestamps correspond to time in video recording)**

- **Participant 1 (Female, 20s, South Asian) -**

Task 1 - 00:25 - 2.5 mistakes:

- 0:18 - "Initially I found it hard to tell how far each obstacles was" ... "There was definitely an adjustment period for perspective"
- 0:41 - "Other than the initial unnatural period, I thought the task was pretty natural. It took a **5 second adjustment period**"
- 1:09 - "I think I could probably use this interface for a relatively long time. **15 minutes?**"
- 1:28 - "**All of my attention was focused through the interface.** Didn't really look away from the iPad"
- 4:16 - "I found myself scared of running into other objects outside my field of vision"

Task 2 - 00:20 - 2 mistakes:

- 2:24 - Ran into trouble when using the temporary solution for task 2 -- "holding down an arrow button isn't a natural way to play video" - "The button flow was kind of awkward"
- 4:45 - Looking through the iPad was very natural -- "Kept moving until I found the goal"

Task 3 - 00:22 (0:10 / 0:11) - 3 mistakes:

- 3:23 - Made a mistake when trying to highlight interaction-- drew too big of a circle around the "wolf"
- 5:41 - "The instructions were too cluttered and distracting" ... "felt pressure to read all the text instead of looking where I'm walking / moving" -- make instructions more clear / visible / concise
- 5:58 - Had to think about where the fireplace was. Took a few seconds to locate.
  - "I was confused about whether I had to look around for a fireplace"
- 7:33 - Overall Interface comments
  - "Use less distracting ways of giving directions" - speech bubbles?
  - "Color made it difficult for me to read the text"

**Stories that Move**  
**Med Fi Prototype - HCI (INFO 6410)**  
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- “too much text”
- “add segmentation between story and instructions”

**- Participant 2 (Female, 20s, East Asian) -**

Task 1 - 00:23 - 2 mistakes:

- 0:42 - “I don’t know if look at screen or look at the actual environment” ... “not sure whether to look at image or surrounding”
- 1:01 - Walking around with a screen is “not at all natural”
- 1:12 - “Found it hard to figure out where to focus. When I see something on the screen, I have no way of estimating where things are in proportion to everything else”
- 1:51 - “If I was to estimate, I’d say **80% attention is on screen**” ... “I’m confused whether I should even look at environment”
- 2:35 - “I got tired after **1 minute of holding the iPad**” ... “probably could last **5 minutes total**” using the interface
- 2:49 - “When I talk to you, I’m not sure if I should look at the screen or look directly at you”

Task 2 - 00:15 - 0.5 mistakes:

- 3:56 - “I see it (the wolf) but don’t recognize it as a wolf before I look away from it”
- 4:32 - When compared to moving around, looking around is “worse because I get dizzy and basically car sick”
- 4:45 - “The issue is that if I miss the target, I have to do it in another sweep. This causes extra movement and makes me dizzy.”

Task 3 - 00:09 (0:05 / 0:04) - 1 mistake:

- 6:31 - “For the first one, the instructions weren’t that clear because I was reading from left to right. Two of the messages didn’t make any sense”
- 5:51 - Mistake - drew multiple circles before correctly “circling the wolf” - “click on the wolf and get no feedback” (6:44)
- 6:52 - “very straightforward to drag the logs because when I drag it I can see a response”... “didn’t have trouble finding things on screen”

**- Participant 3 (Male, 20s, Caucasian) -**

Task 1 - 00:12 - 1 mistakes:

- 0:57 - “I want to go to his house but I don’t know where his house is” - AR viewport gives no indication it’s a physical location
- 1:23 - “Realize seeing the real world, but I still keep **thinking that I’m going to walk into something if I walk around**”
- 1:51 - “I feel natural using the interface but feel like I’m going to trip on something even though I can see what’s in front of me”
- 2:00 - “staring at something in front of me (iPad) **makes me afraid I’m going to run into it**”
- 2:21 - “I felt acclimated pretty quickly -- **less than 20-30 seconds**”... “I could probably use this for **10-20 minutes**”

**Stories that Move**  
**Med Fi Prototype - HCI (INFO 6410)**  
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- 3:09 - “at least **80% of my attention is on the ipad**”... “even when I talk to you guys, I swing at you”
- 3:31 - “Biggest factor when I’m using this is the fact that I’m a **7 out of 10**” in tiredness

Task 2 - 00:15 - 1 mistakes:

- 5:00 - Mistake: moved forward instead of changing perspective (axis) / looking around (up down)
- 5:29 - “I was easily able to locate it BUT found it kind of weird that I’m less inclined to look down when holding the iPad”... “makes me feel more removed” ... “looking down and being occupied by something makes me feel out of it”

Task 3 - 00:19 (0:14 / 0:05) - 0 mistakes:

- 7:03 - “finding the instructions was pretty easy”
- 7:20 - “logs were a little small” (hard to see)
- 7:37 - “didn’t have trouble circling the wolf, but would have been helpful to feedback on the circling”
- 8:05 - “progress and time remaining is kind of distracting. arbitrarily going up and doesn’t correlate with anything I’m doing”

**- Participant 4 (Male, 20s, East Asian) -**

Task 1 - 00:19 - 0 mistakes:

- 0:21 - “the house should be in augmented reality?” - was expecting augmented reality despite instructions otherwise
- 0:42 - completed the task very easily. didn’t have any trouble and easily stepped over and through obstacles
- 1:06 - “I think it’s pretty good. it works for me”
- 1:24 - “In the most ideal world, I wouldn’t need to be holding anything” ... “but I definitely prefer holding an ipad over a phone -- bigger screen”
- 1:51 - “Less than **5 seconds of transition period** where I felt strange”
- 2:08 - “I think I could see myself using this for **<10 minutes**”
- 2:34 - “With the iPad, I worried about tripping on something”
- 2:54 - “while completing the task, all of my focus was on ipad... I was **only looking through the ipad** because I held it pretty closely”

Task 2 - 00:24 - 1 mistakes:

- 4:13 - mistake: tester assumed that the figure would be on the screen instead of a physical character
- 4:48 - “I saw it earlier but I just looked past it” - “I didn’t realize it was a wolf”
- 5:33 - “was comfortable moving the iPad in every direction when searching” but “way more distractions when rotating compared to moving forward”

Task 3 - 00:26 (0:12 / 0:14) - 0 mistakes:

- 7:41 - “needed a few seconds to find instructions”... “instructions should have a slightly different color or in center to be more clear”
- 7:58 - “once i had an idea of where instructions were it was really good”

**Stories that Move**  
**Med Fi Prototype - HCI (INFO 6410)**  
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- 8:09 - "no issues finding elements for interaction"

**- Participant 5 (Male, 20s, South Asian) -**

Task 1 - 00:10 - 1 mistakes:

- 0:24 - "I don't see any indication of what I'm supposed to be looking for" - was expecting augmented reality
- 1:07 - On using the interface - "It wasn't that bad. The field of view is large enough so that it engrosses your attention. Better than a smartphone"
- 1:29 - "There were obvious issues with depth. I couldn't tell how far something was through the camera"
- 1:40 - "Interface doesn't feel as disconnected as I expected"
- 1:52 - Amount of time using the interface would depend on how "interesting the content is" but "**probably have fatigue issues**"
- 2:32 - one attention split - "it wasn't that bad - **80/20**. I did have to glance around so that I didn't bump into something"

Task 2 - 00:11 - 0.5 mistakes:

- 3:52 - on first try - "while rotating, the wolf came into my peripheral field of vision"
- 5:07 - "it feels unnatural to move yourself around (rotating)" ... "turning around rely on peripheral vision so you can't focus on the iPad because my attention automatically goes sideway"

Task 3 - 00:10 (0:07 / 0:03) - 0 mistakes:

- 6:31 - "it was easy to find the directions" but "what was confusing was that there were so many messages"
- 6:40 - "only one message would have been helpful because ⅔ of messages weren't necessary"
- 6:50 - "for the second interaction, it was a lot easier because I knew where I should be looking"
- 7:18 - "didn't have trouble finding on screen artifacts" but "circling interaction felt weird in comparison to just tapping"