

AR Playhouse HoloLens 2 Subject Testing Protocol

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I. Preparation and Setup

- A. Bring all items on the [Subject Testing Resources](#) spreadsheet to the space
- B. Set up the participant resources (see here for a printable [checklist](#))
 1. Posters on wall
 2. Printed resources on table
 3. Registration resources mapped out in space
 4. Participant laptop/tablet for survey
- C. Set up research resources
 1. Laptop plugged in, charging
 - a) Start a Zoom meeting as a recording hub (alternate recording such as screen recording or other software is also an option. Watch out for time limits--windows screen recording has a 15 min limit)
 2. Hotspot plugged in, running
 - a) Laptop connected
 - b) Set HoloLens to default to this network
 3. Tablet/smartphone/video recorder with wide angle lens set up in corner of space

II. Subject Testing

- A. Pre-activity Survey-you may consider using a survey to gauge learning
 1. While they are taking the survey, connect to windows device portal
 - a) Navigate to the IP address of the hololens on your network (find this in hololens settings after connecting to the network).
- B. Narrative and Preparation
 1. *"You will be participating in a simulated hands-on build activity involving an evaluation of an existing structure and construction of renovations. The simulation will take place using a Microsoft HoloLens, an augmented reality device, which allows you to see the physical room through clear lenses while simultaneously projecting virtual holographic content in the room. This video explains the project overview."*
 2. Show [video](#) on the same laptop as the survey
 3. *"To complete the objectives outlined in the video, you will need to know about your resources and how to navigate the augmented reality space"*
- C. Registration and Training in HoloLens

1. *“First, let’s take a look at the physical resources you have available.*
 - a) *CATALOG: This catalog contains all orderable objects with associated cost, time, and sustainability value. Use it to order items for your design.*
 - b) *SAFETY HANDBOOK: This handbook contains guidelines for playground safety and hazards to avoid*
 - c) *SUSTAINABILITY PAMPHLET: This page explains the city sustainability initiative and the meaning of the sustainability values in the catalog*
 - d) *PAPER/PENS/POST-ITS: You can use these to plan, draw, and mark as needed.*
 - e) *PAINT SAMPLES: These can be used to choose paint colors and compare color options for parts of the playhouse*
 - f) *MEASURING TAPE: This can be used to measure playhouse dimensions in planning for renovations. Make sure to only use it in “normal view” because in child view, the pieces will not be to scale. “*
2. *“Next, I will show you how to use the HoloLens.”*
 - a) *“When you put on these glasses, you will still see the room around you, but you will also see virtual, holographic items projected around the room.”*
 - b) *“Turn it on by pressing the button on the back”*
 - c) *“Place the glasses on your head and adjust them to be comfortable, using the scroll wheel at the back to loosen or tighten the headband”*
 - d) *“Follow the instructions for eye calibration”*
 - e) *“This device is controlled by voice commands (things you say) and gesture commands (motions you do with your hands). I will walk you through everything you need to know to use it.”*
 - f) **Connect to/Refresh Windows Device Portal. This requires no input from the student, just make sure it is connecting and showing the 3D view properly. Also make sure the Zoom meeting is recording and both views (third person wide angle + casted view) are displaying properly. You will need to share the screen with the windows device portal**
 - (1) **Ensure the audio from the HoloLens is being picked up as well. This means when you first share screen, make sure ‘share sound’ is checked.**
 - g) **Registration**
 - (1) *“First, we need to open the application and make sure the holograms are in the right place”*
 - (2) *“Stand on the arrow, facing the direction it is pointing”*
 - (3) *“Open the menu by looking at your left wrist and touching the windows symbol with your right pointer finger”*

- (4) "Click 'all apps' by poking it with your pointer finger"
- (5) "Click the down arrow to see more apps"
- (6) "Gaze directly at the building across the street. This helps calibrate the application correctly"
- (7) "Click 'AR Playhouse Simulator' while continuing to stare directly ahead. This will open the application."
- (8) "Tell me when the words 'Made with Unity' disappear"
- (9) "Do you see a floating coke can?" [help them locate if not]
- (10) "Drag the coke can onto the actual can placed on the floor until it matches the size and location. You can drag objects by grabbing them with your whole hand or by pinching them with your thumb and forefinger. When you have placed it in the right location, release your hold."
- (11) "Walk around the can to make sure it is located in the correct position."
- (12) "Say 'SET SPACE'"
- (13) "Now say 'vanish' to make the can disappear."

h) Training

- (1) "Let me walk you through the virtual space. You are looking at the current playhouse. You can explore it by walking around and by using the navigation tools here [gesture to toolbar]."
 - (a) "Toggle Level allows you to move between the ground and the second floor" [Have them try it once then go back]
 - (b) "Toggle View allows you to enter Child View or go back to Adult View. As explained in the video, you may want to explore child view to understand how the structure would look to a child and make decisions based on their perspective" [Have them try it once then go back]
- (2) "Over here is your pickup truck. When you order items, they will appear behind the truck."
 - (a) Try saying 'Order Test Panel'. You can see that the panel appears behind the truck
- (3) "If you want to return an item, simply place it in the truck bed and the cost/time will be refunded. If you want to discard an item (either one you ordered or one you took off the playhouse), take it to the dumpster and throw it away" [Gesture to Dumpster]
- (4) "Here are your other virtual tools" [paintbrush, drill, laptop]
 - (a) "On the laptop, the amount of money and time you spend will be updated when you order an item"
 - (b) "The paintbrush allows you to paint wood objects"

- (i) *“Try this: say ‘order test paint’” (this one is part of the training so your cost/time will not update)*
- (ii) *“Drag the paintbrush over to the paint”*
- (iii) *“Dip the paintbrush in the paint, then bring it over to the test panel you ordered. Paint the panel by intersecting the paintbrush”*
- (iv) *“Let’s say you decided against this color. Drag it to the dumpster to throw it away (this will not impact your cost).”*
- (v) *The last tool to learn is the virtual drill.*
 - (a) *Go get the virtual drill and bring it over here”*
 - (b) *“Intersect the drill with the panel, then say ‘Drill’”*
 - (c) *The screws have been removed and now you are able to move the panel.*
 - (d) *“To reattach, drag this panel over to the the hole, position it in place, intersect the drill, and again say ‘Drill’”*
 - (e) *“You can do this to any item that has screws in it, just remember that the 8 structural pillars, 4 floor platforms, and 2 roofs are not movable.”*
- (vi) *The physical measuring tape can here can be used to measure openings or other parts of the playhouse to determine what size of objects to order. Remember only to use it in normal view (which is to scale), not child view.*
- (vii) *“If you look down, you will notice that the ground is currently grass. You can change the play surface with a voice command, found in the catalog and on the poster. Be careful, however, because when you change the surface, it will automatically charge you and cannot be refunded”*
- (c) *‘Now you have seen how to use voice commands and gestures and all of the types of changes you can make to the structure. There are posters on the wall to remind you of the possibilities. Take a good look through the catalog to see what your options for play equipment are.’*

(d) "Don't forget to consider time, money, sustainability, safety, and fun as you complete this exercise."

(e) "You will have 20 minutes of unsupervised design and building time starting now. Do you have any questions before you begin?"

D. Testing

1. Observe as they design and build. Make sure everything is being recorded.
2. After 20 minutes, stop them and have them explain the next few major steps that they were going to take (keeping the headset on)
3. **Ask IQ1: How did that go for you? (make sure the computer mic is picking up their interview)**

E. Post-activity Interview

1. Have them complete the second half of the survey if you so desire
2. Download the text files from windows device portal
3. Begin Interview (make sure it is being recorded). Make sure they are aware of time limit (5 min).
 - a) **Tell me about what you did-what was your overall strategy?**
 - b) **In your opinion, what were the most important changes you made and why?**
 - c) **How did this whole experience make you think differently about your priorities?**

III. Thank the participant for their time

IV. Reset for Next Subject

- A. Save/upload any video, audio, etc
- B. Close hololens application to reset
- C. Check battery pack levels
- D. File any used/marked paper items