Dr. Spinola

Proctor: Alright. So after you put this on, it will…. it'll… You pull it out, and then you can adjust it so that you, you can see through it.

Proctor: And then, um,… So, you'll see like a, sorry, the word is escaping me, you'll see a bounding box around the robot gripper and then… Kind of label them here: you've got some handles, the ones that are highlighted in blue on each side of it. You can- With the HoloLens, you have to, kind of, like, exaggerate your hands for it to really detect it, and when you let go of something, exaggerate coming back off of it. But, you can pinch those to translate the object in any which one of those directions of the axis that it's on, and then- The little highlighted yellow ones here along the sides, you'll see, well, just rectangles. You can grab, pinch, those as well, and then you can rotate it based on that. And then, so, the idea here is: you're just going to play with it, and you're going to try to pick up, pick up and place these blocks however you want to do.

Proctor: And then, I'll ask you some questions along the way and I'll, kind of, get your thoughts on it while you're doing it. And then, also, one last thing; if you hold your hand out like this in front of your face, you'll see it should be like a gripper thing that'll pop up on it. That's a slider. You can move that with your other- You can pinch it with your other hand, and it will control these grippers. Pinch it. Yeah, and as you move it, you know, you can open and close the gripper if you do that. So that's how- That's pretty much the full functionality of that interface. So, you can move it and try to grab these blocks.

[Audio gap, picks back up again at 2:20]

Participant: How can I…

Proctor: Which one are we trying to grab? Let me also…

Participant: This one here…

Proctor: On the bottom?

Participant: Yeah.

Proctor: That would be a little bit difficult, but I find it best to come up under it. Come up underneath and, yeah. We'll pull up *[unintelligible]*, so I can see what you see.

[Audio gap, starts up again at 3:26]

Participant: Alright, I'm having some trouble.

Proctor: In the bottom one?

Participant: Yes, in the bottom one.

Proctor: You also do it from the top, the top should do the same. That one is easier. There you go.

Participant: Are the bounds here correct? *[Difficult to determine question.]* When I press, it's not doing anything…

Proctor: I think what's happening is that your hands down here, it's out of the limit. It's the limitations of the HoloLens. So like, the HoloLens can't see your, your, your, your [hands] anymore when you're down here, kind of. And I think it might be part of the problem with that. You bring it up more in front of your face. Then [it] can definitely pick up more of the gestures that you're making.

Proctor: You can also try, um,…

[Short Audio Gap]

Participant: I think I'll need maybe one hour to complete the task.

Proctor: It's okay. It's not- We're just- I'm just letting you play with this, and I'll ask some questions. You can, you can also go to the actual items, and grab more closer to the robot, too; and, maybe that works for you. So you can- Yeah.

Participant: That’s better.

[Short Audio Gap]

Proctor: Instead of pinching with your hand parallel to the table, pinch it perpendicular so that it can definitely see it.

Participant: Oh, Okay.

Proctor: Now, you can grab the gripper better. Yeah.

Participant: Okay, so now, how can I grab it and take the…

Proctor: The grippers were like this.

Participant: Oh, okay.

[Short Audio Gap]

Proctor: You’re good, it's just a little bit… Yeah.

Proctor: If the box turned red, it’s because it fell out of the safe range of motion.

Participant: It's red.

Proctor: If it's red, that's because it's outside the safe range of motion. So it's going to get you- It's not going to move it until you get back up into, like, this area where it's going to be safe for you to move it again.

[Short Audio Gap]

Participant: Could you say it again? Why is it red here?

Proctor: It's read because it's- So, there's a, there's a bound area where, where we said for it to be safe range of motion.

Participant: Okay.

Proctor: If you move it more up- Because, what it is is it's too low right now, and then it will- It should fix itself and become white again.

Participant: Oh, Okay.

Proctor: Yeah.

Proctor: So, as you're picking up the first block, what are some of your thoughts on the… Not, not necessarily the robot, but just the interface that you're working with: the bounding box itself, the gripper controls. Are they easy to use? Are they difficult to use?

Participant: So, it is my first time that I'm using [a Hololens]. It's a little complicated because, you know,... I have no idea how to manipulate the technology. So…

Proctor: Just, um… Move it up just a little bit.

[Audio Gap (Proctor steps away to confirm robot controls), starts up again at 10:45]

Proctor: Do you find it difficult to, like, grab the bounding box and interact with it?

Participant: Yeah, grab the, the, the, uh… It *[unintelligible]* here. It's a little difficult for me.

Proctor: Is there anything that you would- What would you change, I guess, to make it easier for you? Like what…

Participant: Uh…

Proctor: Like, if you could have it be, you know, a different interface or like- How would you might, you might think would be better for you?

Participant: Maybe have a previous training on how to point correctly to the.. You know, to the… I don't know how to say this in English, but…

Proctor: To the handles?

Participant: To the handles, yeah. Because here, I point to handle. So, when I close my, my, my, my hands not always, you know, I think get the, the, the, the handle.

[Audio gap, starts up again at 12:27]

Proctor: Is there anything else that you like about it or dislike about it? As you're playing with it?

Participant: Yeah. I think the most important thing is that- Okay here; I'm going correctly to the, to the handle; but, when I close my hand sometimes it do not respond correctly to my command.

Proctor: For a second block, can I change something with it real quick? And I'm gonna- I'm going to get you- Can I change something with it real quick and then I'm gonna get you to keep going?

Participant: Yeah, sure.

Proctor: Can I see it for a second?

Participant: Sure.

[Audio gap (Proctor seeks advice on how to activate "god mode"), starts again at 13:20]

Proctor: All right. So now, with this new mode, you don't have to worry about pinching the handles. You can just pinch anywhere inside the bounding box. So just- Like you can look on the screen over here and I'll show you. So, you can see my fingers are not on the handles right now. I'm going to pinch right here, and you can see I can just move the bounding box. I don't have to be on a handle.

Participant: Okay.

Proctor: …and the robot will follow it.
[Audio gap (the robot gets too close to the table), picks up again at 15:16]

Participant: I think it's frozen.

Proctor: Yeah. Let me see if I can fix that.

Proctor: Alright, here we go. I'm new to this, so be flexible with me.

Participant: Okay.

[Audio gap (technical issue with the robot), starts up again at 17:07]

Proctor: Do you like this mode more?

Participant: Yeah, this one is much more easier. You know, you'll see that I can manipulate more easily there.

Proctor: So the goal of this is to be able to make- We found when programming robots, [like the] robots over there, that while the language, block-based languages, would create easier- It would help end-users build a program that they necessarily might not be able to. We found that they still ran into a bunch of errors. They had issues being precise. So the idea behind this one is to have, is to have a hologram there so that; to help users understand the boundaries of the robot so they can be more precise.

Participant: Okay.

[Audio gap (as the participant uses the robot), starts up again at 18:22]

Proctor: You don't have to get directly on the box; because when the grippers close, they'll be lower.

Participant: Ah, okay, okay.

Proctor: When they- ‘Cause, they kind of open in that… Yeah, so that'll probably actually close onto the box.
[Audio gap as the participant uses the robot, starts up again at 19:02]

Participant: Yeah, I don't know what's *[unintelligible]*; because, they always have some kind of difficult, you know, to, to push.

Proctor: To push?

Participant: Yeah, to grab on some idea. But this mode is familiar. It was much more easy than the first one.

Proctor: Okay. The only question that they want me to ask is: do you have any, like, real world examples that you think this would be useful in? Just this, kind of like, the build foundation, I guess.

Participant: Okay. You start talking about, you know, larger, you know, robot arms- maybe [in] building, construction. So you can manipulate to high- I don't know how to say this: high blocks.

Proctor: Like, cinder blocks? Something like that?

Participant: Yeah, like that. Yeah, that would be *[unintelligible]*. I'd say. It's *[unintelligible]*. It's, maybe, it's not good because I think it's missing precision on how to manipulate the arm.

Proctor: So, it's missing precision. What would- Could there be, like, solutions out there, you think, to help you be more precise? Because, you know, like, for instance: some professors said having, like, a show of, like, axes, being, you know, like a vector going down; or, being able to lock on[to] the different axes, so you're only working on one at a time, which is kind of like the idea of the bounding box. You're only messing with one axis at a time.

Participant: I think that, maybe, first of all, again: for me, I have more precision on how to grab the columns here that I'm seeing. You know, because we saw I tried several times and sometimes I just could, couldn't, you know, grab the handle. Yeah, that's most difficult to me. And also maybe… You could provide some kind of help. Can you see here, for example: okay, now you can close the robot's hands; because if you continue to push the arm down, then you'll, you'll go, uh… Because there is a boundary that I cannot, I cannot put this box to, to flow. So if there is a complicate, you cannot do that. You stop here and just close the hand of the robot. That's there on the robot, you can just take the box. So, this kind of range of communication would be good, too.

Proctor: Okay.

Participant: Okay. Uh, let me see. Maybe if they brought or they saw that people perform some kind of task. Because, I'm trying, for example, several times to open and close the hand. So, if they perceive that I tried several times and it was not possible to perform that command, maybe, maybe they can show me some hints of how to perform correctly that, that command because they know it's- Somehow, I'll be training in manipulating the robot while I try to manipulate it.

Proctor: Alright, I understand what you're saying.

Participant: Okay. I think that's all for, for a while.

Proctor: I appreciate your time. That's pretty much it. We just want you to play with it and get some feedback. Okay, so we're all good here. Imma stop this.