

# Appendix

Team HI-BC  
CDM C15 SPRING 2021

**Team Members:**

**Karen Lee, Daniel Tian, Emma Liu,  
Cornelia Lai, Heesu Kim**

**Faculty Advisor:**

**Robyn Sussel**

# Appendix

## Project Timeline

Week	Date	Tasks
Week1	Jan 11 - Jan 15	Project Brief / First CPD-CDM Meeting / Team Charter/ Research
Week2	Jan 18 - Jan 22	Research / Ideation / Storyboard
Week3	Jan 25 - Jan 29	Miroboard Session (CPD-CDM)/ Build 2D prototype v1
Week4	Feb. 1 - Feb.5	Build 2D prototype v1/User Testing with Dr.Chang
Week5	Feb. 8 - Feb.12	Mini 3D Build for concept demo & 2D prototype v2 / Animation Chart / 3D Asset Research
Week6	Feb.15 - Feb.19	Build 2D prototype v2
Week7	Feb.22 - Feb.26	User Testing with Dr.Yau & 2 CTA (2D prototype v2) / Refine 3D mini Build/ User Journey Map
Week8	March 1 - March 5	User Testing with a CTA(2D prototype v2) / Build Interactive Tutorial Mock-up (Patient-Side)
Week9	March 8 - March 12	User Testing Result Synthesis & Ideation / Wireframe for the entire process / Refine 3D Mini Build to MVP
Week10	March 15 - March 19	CDM Cohort & Faculty Feedback Sessions on 2D prototype v2
Week11	March 22 - March 26	User Testing with 3 CTAs / User Testing Result Synthesis & Refine MVP
Week12	March 29 - April 2	User Testing with Dr.Yau / Refine MVP / Build Interactive Tutorials
Week13	April 5 - April 9	Final Presentation of the Project for CPD
Week14	April 12 - April 16	CDM internal demo / Final Documentation / Final Submission

# User Testing Report Summary

## 1st Round User Testing (CTAs)

From Feb 05-March 05, we had our first round of user testing with 2 UBC CPD Doctors and 3 CTAs.

- All the CTAs mentioned that they would provide instant feedback during the role-play, so that the team built a real-time mood bar for CTAs to express their emotions and provide instant feedback in response to IMGs' actions and words.
- All the CTAs mentioned or confirmed that there is rarely a need to raise one arm at a time. Both arms should be slowly raised at the same time, so that the team changed the action from raising arms one at a time to raising both arms at the same time.
- During the role-play, all the CTAs mentioned that they would warm their hands before performing the breast exam, so that the team added a 'wash hands' button and action for CTAs to warm their hands.
- During the role-play, all the CTAs mentioned that they would ask the patient to remove part of their gown to do the exam, so that the team added a 'undress' button on the patient side to partly/fully remove the gown based on the doctor's requirement.
- 2 out of 3 CTAs didn't get how the toggle works during the role-play, so that the team included the action on/off explanation in the interactive tour to let the users have a better understanding of how to do/undo an action.
- 2 out of 3 CTAs pointed out that it's difficult to figure out the intensity of the emotions and it's good for them to express the various degrees of emotions, so that the team added a feature displaying the number of times a particular emoji was clicked above the respective emoji on the mood bar.

## 2nd Round User Testing (CTAs)

From March 25-March 29, we had our second round of user testing with 1 UBC CPD Doctor and 3 CTAs.

- All the CTAs and the UBC CPD doctor preferred to be teleported rather than manually moving around. The team changed from freely moving around to only keep the 'AD' key for the users to rotate the view and no 'WS' key from both the navigation panel and tutorial. The entire role-play is possible using teleporting rather than manually moving around by using the keyboard.
- 2 out of 4 participants mentioned that the free-hand movement function is necessary and would increase the hands-on experience and benefit for

learning/teaching purposes, so that the team kept the free-hand movement function to allow the doctor to do the actions freely.

- 1 UBC CPD doctor mentioned that for the medical teaching/learning purpose, the doctor should ask the patient to remove the clothes to check the skin if it has a scar or did surgery before, so that the team built the 'remove the whole gown' option into the 'change clothes' feature so that the doctor can see the front and the back of the patient.
- 2 out of 4 participants mentioned that they couldn't see the patient's breasts clearly due to the position or shadow during the role-play so that the team changed the location of the light behind the doctor and adjusted the height of the doctor avatar so that they can have a clear view of the breasts.

## **CDM Faculty Feedback & CDM Peer User Testing**

From March 15-March 16, we had the user testing and feedback session with 2 CDM professors and 5 CDM peers.

- 3 out of 7 participants mentioned that free-hand movement using mouse buttons is too difficult. They prefer an alternative way to do the action so that the team added a more straightforward movement to perform the exam by clicking the 'H' key on the keyboard.
- One participant had trouble with moving around to do actions by using the keyboard; 3 out of 7 participants clicked the button to do the action from where they stood at that moment. The team built the teleporting option for the wash hands, go outside/inside the room, and examine actions to save time and effort for the users.

# User Testing Report

## 1st Round User Testing (CTAs)

Feb 05, 2021, UBC CPD Dr. Derek Chang (2D Prototype v1)

Observations	Changes
The text on Dr. Derek's screen was super small, and he couldn't change it. The problem may be caused by the difference between Windows and Mac.	The Team should let users know before the testing that they need a Windows PC. We can try to build a version that can work on both Windows and Mac if time permits.
Dr. Derek wanted to do the 'put your arm down' action, but there is no button for this action.	Built 2D prototype v2 where it is more clear to users clicking a button triggers an action. We also added more essential actions to our refined prototype so that they can do the entire role-play using the prototype.
Deborah mentioned IMGs receive immediate feedback from instructors. For instance, If the IMG says something incorrect, he/she will get corrections from CTA during the role-play. Dr. Dereck agreed on this.	Built a real-time mood bar for the CTAs to provide instant feedback in response to IMGs' actions and words.

Feb 22, 2021, UBC CPD Dr. Yau (2D Prototype v2)

Observation	Changes
The first sentence he said after he entered the 3D platform was "this is terrible, this is why I don't play video games."	<ul style="list-style-type: none"><li>• The Team should consider providing users a 3D space where they can practice navigation skills before the session begins like Second Life Welcoming Land or PUBG training.</li><li>• Changed the rotation navigation more like real-life rather than commercial game conventions :</li></ul>

	Change A/D button to rotate to left/right
Dr. Yau activated all the buttons without clicking them again to undo the actions. As a result, he couldn't do certain actions during the role-play.	Made the action panel in a way that only one button is active at a given time. (clicking another button automatically deactivates the active one) Also, grey-boxed certain actions that are not necessary in a certain posture. For instance, no exam is done in a standing position, so a raising arms action button is grey-boxed when the standing button is clicked)
He clicked on the dot of the mood bar instead of the emoji face. He said, "it is not intuitive. It didn't seem obvious to me while I was manipulating it."	Changed the mood bar from the percentage bar with dots to clickable emojis faces.
He mentioned:" It might be tricky with the heart, particular in the medical context. I don't know if the physician will understand immediately what it means. Does the heart mean the person has a positive feeling toward me or it's simply a happy face?" (It can be misinterpreted as a romantic symbol)	We replaced the heart icon on the doctor' interface with emoji faces to express a variety of feelings such as anger, calmness and confusion.

## Feb 25, 2021, Briana Rayner CTA (2D Prototype v2)

Observation	Changes
When she saw the 'Tripod Position', she mentioned that when they do exams, they put the hands lower on the hips and squeeze in.	Changed the "Tripod Position" of our 3D model based on the feedback.
She also mentioned "Raising the arms one at a time is something that I've never done as a CTA. We raise them both slowly at the same time, so that both breasts can be seen and compared for differences."	Changed the action from raising arms one at a time to raising both arms at the same time and got rid of 'raising one arm at a time' buttons and actions.

If you are concerned about your hands being cold in advance, washing them with warm water before the exam can help.	Added a "wash hands" button and built wash hands action into our 3D prototype.
"Something I would find useful from my end is a time-out button, because it's hard to know when to interrupt somebody, and when we have a time-out button for either side, then we can stop and do a check-in." Briana said.	Added a "time-out" button into our prototype, to allow either the patient or doctor to pause the role-play temporarily and have a conversation.
"Getting somebody close to the edge of the bed, so you can reach both of the breasts easily; getting a pillow properly underneath their shoulder, and an arm usually resting behind their head, so that allows the tissues to relax." And then, moving the draping to the side. Physicians can put the drape on but ask the patient to remove.	<ul style="list-style-type: none"> <li>• Added a pillow on the exam table.</li> <li>• Added a subcategory of 'Undress' button for the patient to be able to remove each side/ both side of the gown</li> </ul>
She wanted to have a button to be able to move her drape. Right now, if she clicks on the 'Raise Right Arm' button, it's automatically undraped already, so IMGs don't have to ask, but she wants them to consciously ask a patient for permission.	Added a subcategory of 'Undress' button for the patient to be able to remove each side/ both side of the gown
When she was trying the 3D prototype, she over-rotated the view, and tried 2-3 times to get to the right direction.	The Team should test the rotate speed and adjust it to the most comfortable speed.

## Feb 26, 2021, Agnes Tong CTA (2D Prototype v2)

Observation	Changes
When Deborah asked Agnes to put her arms back down, she was not sure about which button she should click. She ended up clicking on the 'Tripod Position' button. She didn't get how the toggle works in the	Added an explanation on how the toggle works in the interactive tour to help users better understand how to do and undo a certain action.

beginning, but eventually understood how it works.	
On the mood bar, Agnes mentioned: “My feeling was there are limited boxes; is that representative enough? It’s more like an in-between place with different degrees.”	Displayed the number of times a particular emoji was clicked above the respective emoji on the mood bar so that both the doctor and patient can clearly understand how many times each emoji has been clicked during the entire role-play process.
Agnes mentioned that the doctor would ask the patient to mirror their actions in the real world.	Added ‘Raise both Arms’ animation button. This was one of the reasons the Team kept the camera view in third person because we cannot see your avatar doing a certain action in the first person.
She mentioned that compared with anger, the feeling (she felt during the mock role-play) was more like offended.	Changed the ‘Angry’ emotion to ‘Offended’ because it is not likely that IMGs do outright wrong things to make patients angry. Higher chance of subtle honest mistake which might result in hurting a patient's feelings. Also, the CTA can express their anger by clicking ‘Offended’ emoji multiple times.
When she was trying the 3D prototype, she over-rotated the view, and tried a few times to get to the right direction.	Tested the rotate speed and adjusted it to the most comfortable speed.

### March 05, 2021, Sandi McGinnis CTA (2D Prototype v2)

Observation	Changes
Sandi was confused about when/how the patient gown can be removed.	Included the action on/off toggle explanation in the interactive tour to let the users have a better understanding of how to do and undo a certain action.



Sandi wanted to express the various degrees of emotions.	Displayed the number of the times a particular emoji was clicked above the respective emoji on the mood bar so that both the doctor and patient can clearly understand how many times each emoji has been clicked during the entire role-play process.
Sandi mentioned that it's not about raising arms position but about the movement itself the doctor should be watching, and there is rarely a need to raise one arm at a time.	Changed the action from raising arms one at a time to raising both arms at same time and got rid of raising one arm at a time.
Sandi was using a tablet rather than a computer, so that she couldn't do the full use testing.	The Team should let users know before the testing that they need a Windows PC

## 2nd Round User Testing (CTAs)

March 25, 2021 Briana CTA (March 26th Build 3D Prototype)

Observation	Changes
Briana tried to do the walk forward action by clicking the 'W' button on the navigation panel instead of pressing the W key on her keyboard.	Made the tutorial text explanation clearer. Also changed the Figma prototype so that the user can move around in the 3D space only by using the keyboard.
When we asked Briana whether she prefers to walk manually, moving around to do the actions or being teleported, she said, "teleport me." And it would be better to save them time, and they will spend more time talking through the exam. Teleporting would be great.	Made changes so that the entire role-play is possible using teleporting rather than manually moving around by using the keyboard.

When Briana wanted to open the navigation tip window, she clicked on the 'H' icon instead of the navigation icon. She didn't make the connection between the navigation icon and the navigation window.	Added tooltips for the top three icons to make them clear to understand. Also added an explanation for them inside our tutorial.
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### March 25, 2021, Agnes CTA (March 26th Build 3D Prototype)

Observation	Changes
<ul style="list-style-type: none"> <li>When Agnes wanted to do the 'Knock Door' action, she clicked the button where she stood and knocked on the door inside the room.</li> <li>When Agnes wanted to wash her hands, she had trouble moving near the sink and putting her hands under the faucet.</li> <li>When she was trying to move back to the patient, she couldn't walk properly. She walked backwards to move closer to the patient and said, "awkward."</li> </ul>	Made changes so that the entire role-play is possible using teleporting rather than manually moving around by using the keyboard.
When the doctor was not facing the patient and clicked on the exam button, the doctor was teleported in the exam position, but the doctor's view was still facing the other side.	Made the view automatically facing the patient when the doctor clicked on the exam button, no matter which view the doctor was facing before the action.

<p>Agnes mentioned that in the lying-down portion, generally, most women don't know that the breast tissues can expand to a larger area. So, outlining, where the doctor touches a broader area other than the breast, to signal to the patient where the breast tissues are located and prevent any misunderstanding, is an important part of the exam. In order to do that, the free-hand movement function is necessary (but she was testing via remote control feature of Zoom, and didn't have direct access to hand movement, and couldn't tell how difficult it is compared to clicking a button)</p>	<p>Kept the free-hand movement function to allow the doctor to do free hand movement.</p>
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## March 26, 2021 Sandi McGinnis CTA (March 26th Build 3D Prototype) Results

Observation	Changes
<p>She wanted the ability to see both sides of the breasts clearly when the patient is lying down.</p>	<p>Adjusted the height of the doctor avatar so that she can have a clear view of both breasts.</p>
<ul style="list-style-type: none"> <li>• She had such difficulty understanding how to move the avatar using the keyboard. The Zoom remote control certainly added the difficulty. You need to make Zoom active in order for the keyboard shortcut to work, but she couldn't understand that and kept clicking WASD while Zoom is not active, which caused much frustration.</li> <li>• She said she certainly prefers teleporting over moving around.</li> </ul>	<p>Made changes so that the entire role-play is possible using teleporting rather than manually moving around by using the keyboard.</p>

## March 29, 2021 Dr Steven Yau IMG Medical Director (March 26th Build 3D Prototype)

Observations	Change
When Dr. Yau asked to do the exam action, he walked manually towards the patient to do the action. The second time after he washed his hands and clicked on the exam button, he was teleported to the exam position. After finishing the wash hand action, he said, teleport him right to the exam action. Being teleported is more efficient. It's important to focus on communication and exams.	We made changes so that the entire role-play is possible using teleporting rather than manually moving around by using the keyboard. We got rid of the 'WS' key from both the navigation panel and tutorial, only keeping the 'AD' key to let users rotate the view.
Dr. Yau mentioned that having mouse control is more flexible. He prefers to use the mouse to control hand movement. It made him feel he was actually doing the exam, and it would trigger what he would say during the exam.	We kept the free-hand movement function to allow the doctor to do the actions freely.
When Dr. Yau typed words in the text box, nothing showed up.	We fixed the bug. The text's color was white, and we changed it to black.
During the role-play, there was a big shadow on the patient, and the shadow covered the patient's right breast. Dr. Yau couldn't see it clearly.	We changed the location of the light behind the doctor. There is no shadow on the patient anymore.
Dr. Yau said he normally would check the breast and the back of the patient and asked the patient to remove the gown completely, but the patient couldn't do that because we didn't build the whole gown feature in. Also, for the medical teaching/learning purpose, the doctor should ask the patient to remove the clothes to check the skin if it has a scar or did surgery before.	We built the 'remove the whole gown' option into the 'change clothes' feature so that the doctor can see the front and the back of the patient.

# CDM Faculty Feedback Session

## 1. Professor 1 (Game Design)

- **Date & Time:** March 15, 2021
- **Prototype Version:** March 10th Build (Multiplayer Mode)
- **Purpose:**

It was not a user testing per se because his level of comfort with games is too high compared to our target users, but more of an expert review of the MVP

- **Insights & Suggestions**

- ❑ Are all the buttons on the action panel necessary? If you want to give users freedom to move around (it seems like your team's design decision because you teach them WASD in your tutorial), action buttons like washing hands and knocking the door are unnecessary. When they go near the door, the signifiers can appear (click to knock, click to wash hands). If you think that your users are not familiar to understand the affordance, you do not need to teach them to move around. Keep the buttons as they are, but hard code the positions of each action, so that they don't need to worry about moving around.
- ❑ Free hand movement is too difficult, especially because they move in the opposite direction to your mouse movement, and the user has to constantly think about his/her left and right and the patient's left and right. Why not make each side of the breast always clickable to touch. If you click the left (right) breast, the doctor automatically touches the left (right) breast. You don't need additional buttons for that to happen.
- ❑ Why not use the first person during the role-play and switch to the 3rd person when the time-out button is clicked? a 3rd person camera creates unnecessary cognitive loads for controls. For instance, as a doctor, you have to rotate in order to see the patient.

## 2. Professor 2 (User Experience Design)

- **Date & Time:** March 16, 2021
- **Prototype Version:** Heesu's (Mac User, Remote Control over Zoom)
- **Purpose:**

To see whether the tutorial, navigation and action buttons make sense to users.

- **Summary**

- ❑ (Figma Tutorial) WASD keyboard explanation can be more concise. Rather, giving the tasks (go near the window) will be more effective in familiarizing them with navigation.
- ❑ (Figma Tutorial) She wondered whether she would have the hint window for navigation in real simulation. She thinks people who are not gamers might need it for reference.
- ❑ (3D Doctor Build) She could not find the navigation bar button at all. Even if she saw the navigation help window on the top right side and closed it, she didn't realize the window could be reopened by clicking the icon at the bottom center. The bottom center area was a totally blind spot for her. She suggested when she closes the window, an animation that shows the window goes to the icon will help users how to open it again when necessary.
- ❑ (3D Doctor Build) She had trouble moving near to the sink and putting her hands under the faucet. (She clicked each step and tried to stand in the right position but failed a few times) She said unless having small talk while moving to the sink and washing hands are an important part of the learning, she would rather be teleported to do the action. Better yet, she wants the avatar to walk toward the sink and do the action once she clicks the button wherever she clicked the button.
- ❑ (3D Doctor Build) She likes the details of the clinic room. She also likes the fact that the patient looks real and average rather than a fake skinny, stereotyped character.

## CDM Peer User Testing

### 1. Participant 1

- **Date & Time:** March 15, 2021
- **Gamer?:** rarely plays games
- **Prototype Version:** March 10<sup>th</sup> Build. He couldn't play because he doesn't have a pc, so I just shared my screen and asked 'what would you do' questions
- **Purpose:**  
To see whether the tutorial, navigation and buttons make sense to users.
- **Summary**
  - ❑ (Figma Tutorial) He likes the navigation. Easy to use. So much so that he wants to steal the idea for his team's project.
  - ❑ (3D Prototype) The clinic room is very realistic and detailed.
  - ❑ (3D Prototype - Patient Build) He was able to figure out all the buttons without any explanation or hesitation after going through the tutorial.
  - ❑ (3D prototype-Patient Build) He pondered a little which button to click when he was asked to raise the 'right' arm because he could not decide which is right and left, but he was able to when he saw the tooltip.

- ❑ (3D Prototype - Doctor Build) He was able to accurately tell which button does which even without tutorial, explanation, or tooltips.

## 2. Participant 2

- **Date & Time:** March 15, 2021
- **Gamer?:** used to play a lot
- **Prototype Version:** March 10<sup>th</sup> Build (Single Mode, couldn't connect to multiplayer)
- **Purpose**  
To see whether the tutorial, navigation and action buttons make sense to users.
- **Summary**
  - ❑ (3D prototype-Patient Build) She had no trouble performing tasks after watching the tutorial, but she had to refer to the tooltips to get help.
  - ❑ (3D Prototype - Doctor Build) Controlling hands with the mouse itself is easy, but gamers are used to rotating the view with their mouse, so I need to adjust myself to that new pattern.
  - ❑ (3D Prototype - Doctor Build) When asked to knock the door or wash her hands, she moved closer to the sink or door before she clicks the corresponding action buttons.

## 3. Participant 3

- **Date & Time:** March 16, 2021
- **Gamer:** play games from time to time
- **Prototype Version:** March 10<sup>th</sup> Build (Single Mode, couldn't connect to multiplayer)
- **Purpose:**  
To see whether the tutorial, navigation and action buttons make sense to users.
- **Summary**
  - ❑ (3D prototype-Patient Build) She had no trouble performing tasks after watching the tutorial. She said that on patient's side is straightforward.
  - ❑ (3D Prototype - Doctor Build) She had little difficulty figuring out what the action buttons mean at the first glance, but once she clicks them, it makes sense. She said she is frustrated that the mouse moves in the opposite direction of the avatar's arm movement, and she needs to go way up the screen to move the avatar's arm high up, etc.

- ❑ (3D Prototype - Doctor Build) When asked to wash her hands, she pushed the button from where she stood at the moment.

#### 4. Participant 4

- **Date & Time:** March 16, 2021
- **Gamer?:** rarely play games
- **Prototype Version:** March 10<sup>th</sup> Build (Single Mode, couldn't connect to multiplayer)
- **Purpose:**  
To see whether the tutorial, navigation and action buttons make sense to users.
- **Summary**
  - ❑ (Figma Tutorial) She had no trouble performing tasks after watching the tutorial, and she felt the tutorial is very straightforward and easy to follow.
  - ❑ (3D Prototype - Doctor Build) She had a different thought about the exam patient button. She thought it means the doctor is looking at the patient and using the stethoscope to see if the patient is alright.
  - ❑ (3D Prototype - Doctor Build) When asked to knock the door, she clicked the button from where she stood at the moment.
  - ❑ (3D Prototype - Doctor Build) After she figured out that she should walk to the door and then knock on the door, she just walked through the door into the darkness, but after that she came back and knocked on the door again.
  - ❑ (3D Prototype - Doctor Build) When she was trying to walk towards the sink, she wanted the 3D character to walk sideways.
  - ❑ (3D Prototype - Doctor Build) When asked to wash her hands, she clicked the button before facing the sink, so the character washed her hands in the air.
  - ❑ (3D Prototype - Doctor Build) She felt using a mouse to control the arms is difficult. The movement of the arms is not realistic and limited. She also felt it is unnecessary to have this feature while we are mainly focused on the communication component of the training.
  - ❑ (3D prototype-Patient Build) She had no trouble performing tasks after watching the tutorial. She said that on patient's side is straightforward.

#### 5. Participant 5

- **Date & Time:** March 16, 2021
- **Gamer?:** Rarely play games



- **Prototype Version:** March 10<sup>th</sup> Build (Single Mode, couldn't connect to multiplayer)
- **Purpose:**  
To see whether the tutorial, navigation and action buttons make sense to users.
- **Summary**
  - ❑ (3D prototype-Patient Build) She had no trouble performing tasks after watching the tutorial. She said that on patient's side is straightforward.
  - ❑ (3D prototype-Patient Build) The emoji face pop-up only showed half.
  - ❑ (3D Prototype - Doctor Build) She was not sure about what the wash hands button means. She said to either throw a glove into the garbage or wash your hands.
  - ❑ (3D Prototype - Doctor Build) When asked to knock the door, she clicked the button from where she stood at the moment.
  - ❑ (3D Prototype - Doctor Build) When asked about the question on a scale of one to five, what's the difficulty level of manipulating the arms by using the mouse. She said it was three because, based on different positions, the right and the left side switches. It's a little bit confusing.