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WISER Ethnography Report

In order to make the most of visits to WISER, an Ethnographic plan was developed before observation. The plan included prompts to help view each situation from several different perspectives. The two situations being observed for possible redesign were bronchoscopy training and radial line placement. After a prior visit, it was decided to focus on developing an improved version of the bronchoscopy trainer.

The plan had 5 main sections to fill out:

1. Anthropometry involved – this section was for finding the basic measurements needed for the project, human or device. Mr. Dongili stated here that the trainer should reflect real anatomical dimensions as accurately as possible. As a result, there are 2 key dimensions that need attention: airway length and diameter. There is natural variation in size, but Mr. Dongili stated that a good generalization for length was to measure from the top of the trachea to the xyphoid process of an adult and use half the size for children. For diameter, he stated that children's airways tend to be dime-quarter diameter, while adults grew to quarter-half dollar diameter. In numbers, this translates to:

Age Category	Length of Pathway (inches)	Diameter of Pathway (inches)
Children	[4-7]"	[0.7 – 1]"
Adult	[8-14]"	[1 – 1.2]"

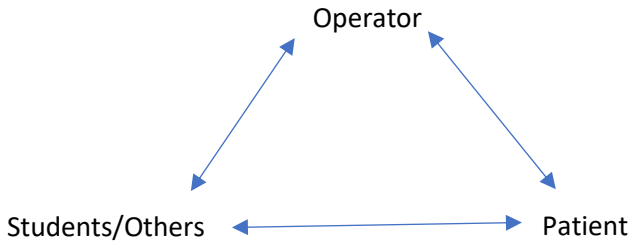
The scope itself was designed to ergonomically fit into the hands of an adult, and no adjustments would be made to the handle. The most important dimension was the probe diameter (~5mm) to make sure that all branches of the revised pathway were not completely blocked off by occlusions.

2. Official Training Procedure – Knowing how actual training students interacted with the bronchoscopy trainer was necessary in order to come up with a better redesign. The procedure was very simple – Mr. Dongili gave a brief demonstration of how to manipulate the probe (joystick + rotation controls), explained the objective – going through the tube and looking at a particular clock point, and then passed it off to the students. After first trials, the apparatus was covered up to make the students use the peripheral monitor as they would in a real bronchoscopy. This demonstrates that only a relatively low-level trainer is needed – something to help develop basic dexterity and familiarity. A good difficulty level for the next iteration would likely be adding in multiple branches and occlusions.

3. Initial Questions – Several questions were prepared before observation to ask Mr. Dongili and Marty about the procedure:

1. How much practice is needed to become proficient? Although much practice is needed before actual operation, the learning curve for the trainer should be fairly shallow.
2. What are major fails during the procedure and how likely are they to occur? A major failure would be to suffocate the patient by probing for too long. This does not happen often so long as the operator is mindful of time (1 minute rule). Scraping damage rarely occurs as the probe tip is blunt.
3. Is it be difficult to keep the probe tip still? No it is not, and this will be experienced in the demo.

4. Perspectives – This section aimed to understand the scenario from alternate perspectives according to the following triangle:



However, this was not particularly relevant as the scenario is for a training tool and not a specific operation. Especially since the training is so hands-on.

5. Miscellaneous – This is where notes from Mr. Dongili's talk were kept as well as ideas made in the moment. The talk was the primary source of design information.

Notes: *1.* The device should me mobile/portable, *2.* The current trainer has no malformations or occlusions – this is key!, *3.* The new trainer should be very basic and intuitive, *4.* Adults can hold their breath for about 1 minute while kids can only for ~30s, *5.* Added occlusions should just reflect variable topology, or 1-6 difficulty on a 10point scale. *6.* Adding occlusions is the priority.

Ideas: *1.* Incorporate side timer to simulate breath, *2.* Print pathway and cast negative out of silicone and hinge the halves, 3. Possible ring compression to adjust pathway diameter and simulate bottlenecks, *4.* Add an orientation line on the probe head for correct entry orientation

The rest of the visit itself comprise of the talk from Mr. Dongili and a demo of the various trainers. I was unable to try other demos including the arterial line placement, but I was able to try out the bronchoscopy trainer. That was the most important as that is the chosen scenario. I would like to have been able to see a real operation to better understand the relations in section (4) of the plan, but anything that would be added may be considered outside of the project scope.

Overall the visit was useful in providing a first-person experience on what the trainer currently is and what it should be. Information regarding what necessary features the new trainer should include was the most important takeaway from the visit. The anthropometry data will also be necessary to dimension the final sketch and figure out physical design limitations, which affects the fabrication process. Overall simplicity of the new trainer will be kept similar as the previous one to provide an easy transition for training.