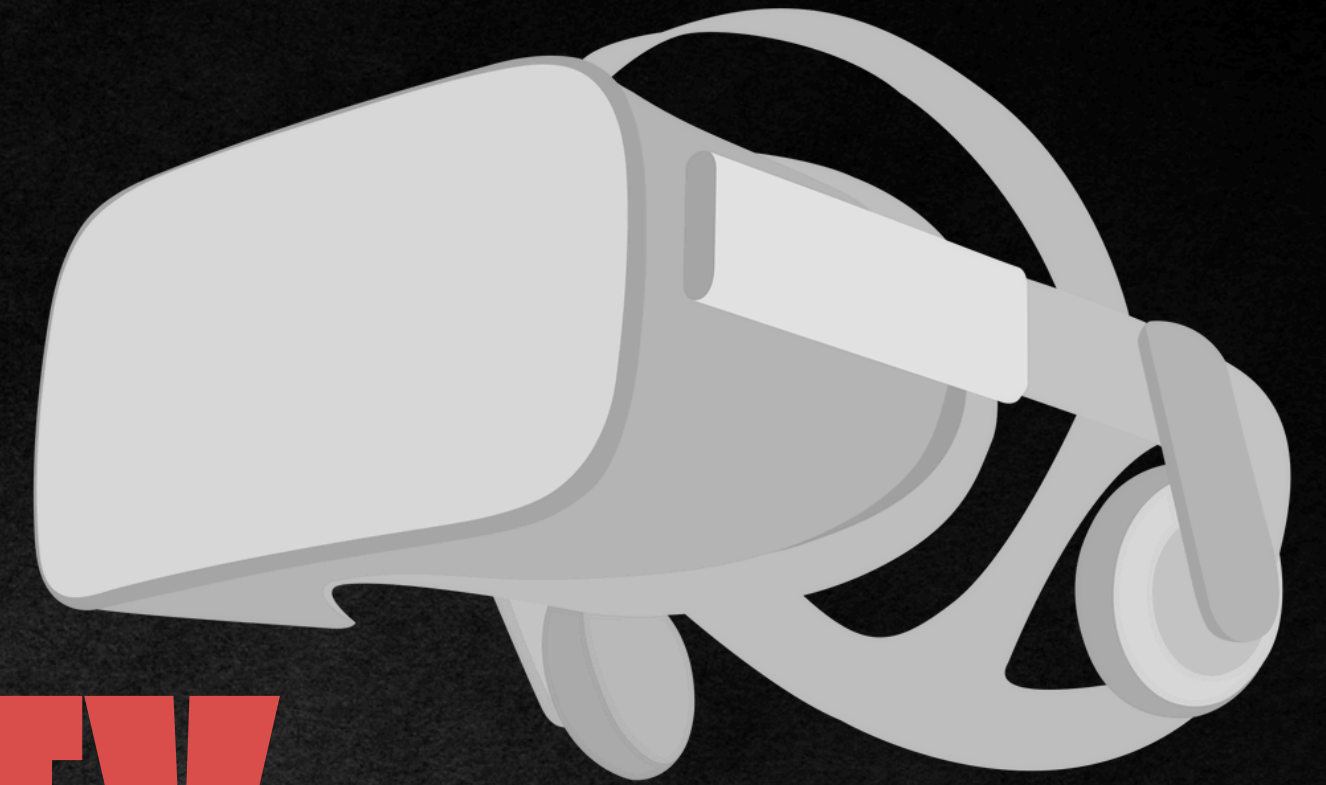


EVALUATING

VIRTUAL REALITY

TRAINING SIMULATIONS

IN NURSING



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THE PROBLEM



NURSING STUDENTS

Too many students,
Not enough IV Pumps

Booking a machine to practice is
time consuming

Getting errors in the machine is
stressful



THE PROBLEM



FACULTY PROFESSORS

Difficult to engage large number of students

Not enough budget to purchase more machines



WHY VR?

The goal is to not replace the real machine but rather to compliment the training so that nursing students can adapt to work with the real machine faster.

It is also more accessible and affordable.

Indicators of knowledge scores (percentage correct) and engagement scales in the pre-test and post-test

Scale	Learning	N	Pre-test	Post-test	Difference
Knowledge scores	Virtual	24	30.1%	55.9%	+25.8%
	Textbook	24	29.8%	46.2%	+16.4%
Engagement scores					
Cognitive	Virtual	24	17.92	20.29	+2.37
	Textbook	24	17.80	18.87	+1.07
Affective	Virtual	24	23.04	23.78	+0.74
	Textbook	24	23.88	24.08	+0.20
Behavioral	Virtual	24	26.17	26.27	+0.10
	Textbook	24	25.87	25.74	-0.13
Agency	Virtual	24	16.14	18.88	+2.74
	Textbook	24	16.99	17.11	+0.12
Total engagement	Virtual	24	83.27	89.22	+5.95
	Textbook	24	84.54	85.80	+1.26

Notes. (N) - Number of participants

Table from Human Anatomy Learning study showing the performance of VR learning method and textbook from 48 participants [1].

[1] I. Korniyenko, I. O., & Barchi, B. V. (2020). Influence of Virtual Reality Tools on Human Anatomy Learning. *Information Technologies and Learning Tools*, 77(3). <https://doi.org/10.33407/itlt.v77i3.3493>

Problem

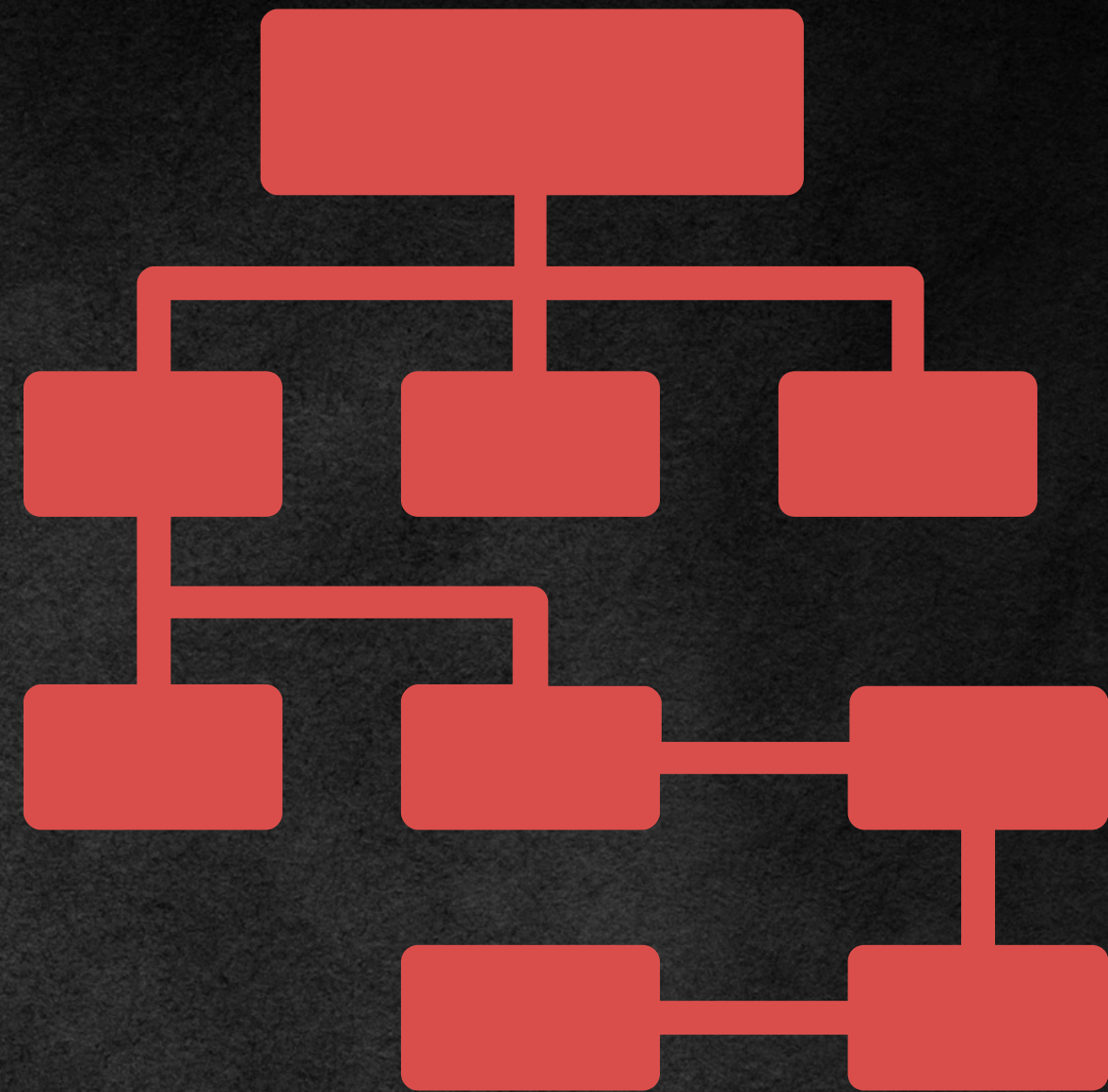
"...due to the lack of real works and the complex internal structure, students can only learn tenon by text, picture, video or 3D model without interaction " [2].

RESULTS OF SUBJECTIVE SATISFACTION TEST

Num	Questions	The average scores of three Groups		
		Group A	Group B	Group C
1	I can learn the knowledge easily.	6.2	8.5	8.4
2	I can understand the model in a short time.	6.5	9.5	9.3
3	I think the feedback is very useful.	1.2	6.0	9.5
4	I think I need help from other people.	9.1	7.8	5.3
5	I can complete the assembly easily.	6.2	8.5	9.2
6	I become more interested in the tenon structure.	7.2	9.5	9.6
7	I made some mistakes in this learning process.	8.6	9.4	9.3
8	I need the tips and feedback when I assemble.	8.9	8.5	9
9	I think the learning method is good to me.	4.5	8.5	8.8
10	I have mastered the tenon structure within specified time.	7.2	9.1	9.2

- Group A: Picture learning method
- Group B: Physical model method
- Group C: Immersive VR interaction method

PHASE 1 DESIGN



THE PLAN

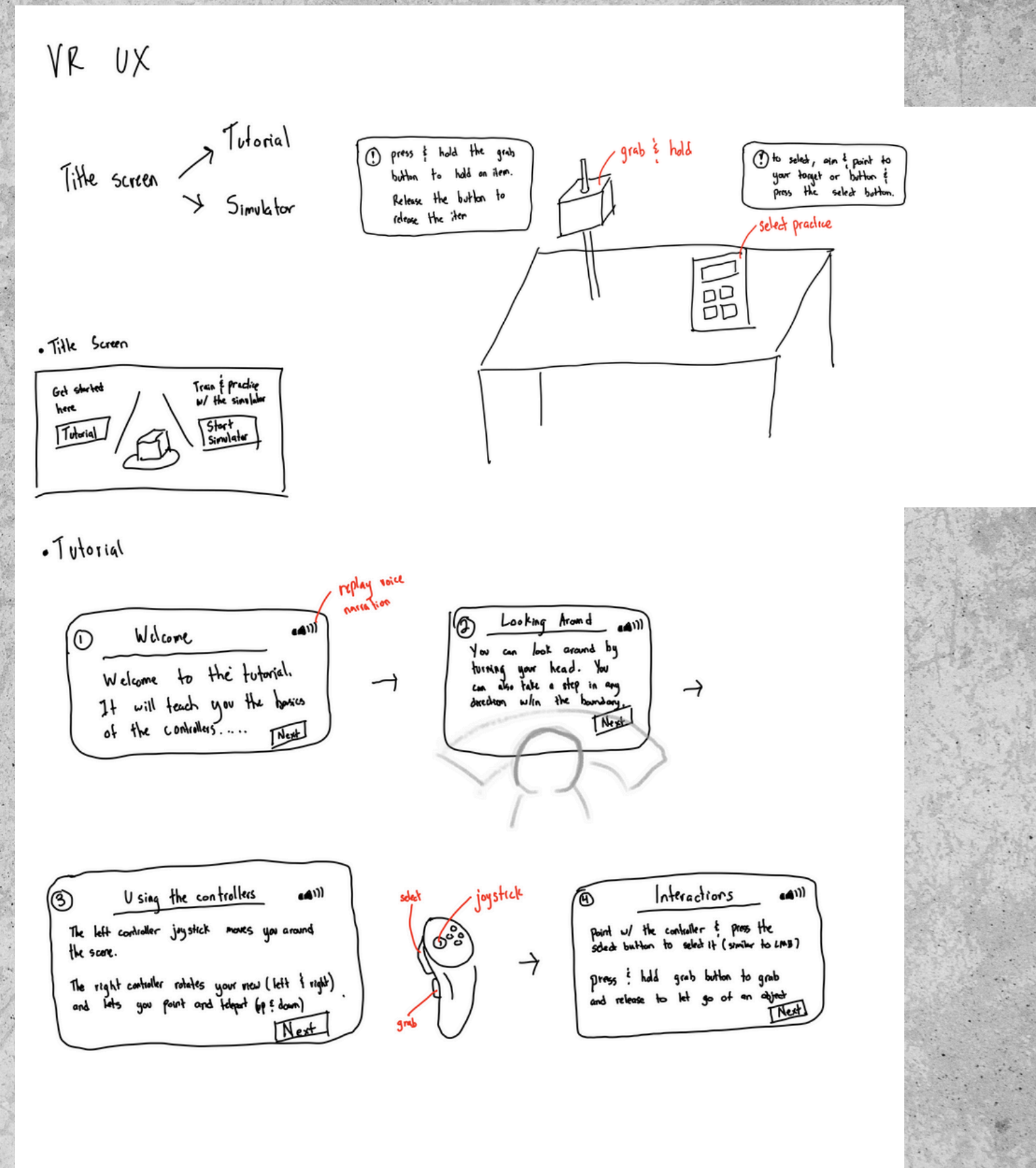
Initial Sketches

Sketch and ideate user journey and data structure and program planning.

- Initial GUI planning for tutorial (image).

Goal (Minimum Viable Product)

Created an MVP that lists the minimum needed features for the simulator to function.



OUR MVP

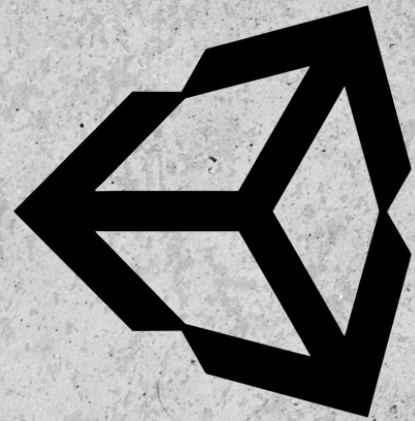
To have a narrated simulation that can take a student through the first three steps of what students are tested on in their finals.

MVP: Minimum Viable Product

PHASE 2

DEVELOPMENT

TECHNOLOGIES



Unity 2022.3.11



Meta Quest 3

VR DEVELOPMENT

Challenges

- Limited resources and knowledge base
- Documentation is minimal and general
- Testing (functionality and users)
- Time constraint and manpower

Recommendations

- Do research prior to development on libraries, software, and tools
- If using Meta Quest, set up a developer account
- Plan/Prototype



Stage 1

Use Unity XR template to explore types of input and input behaviour.



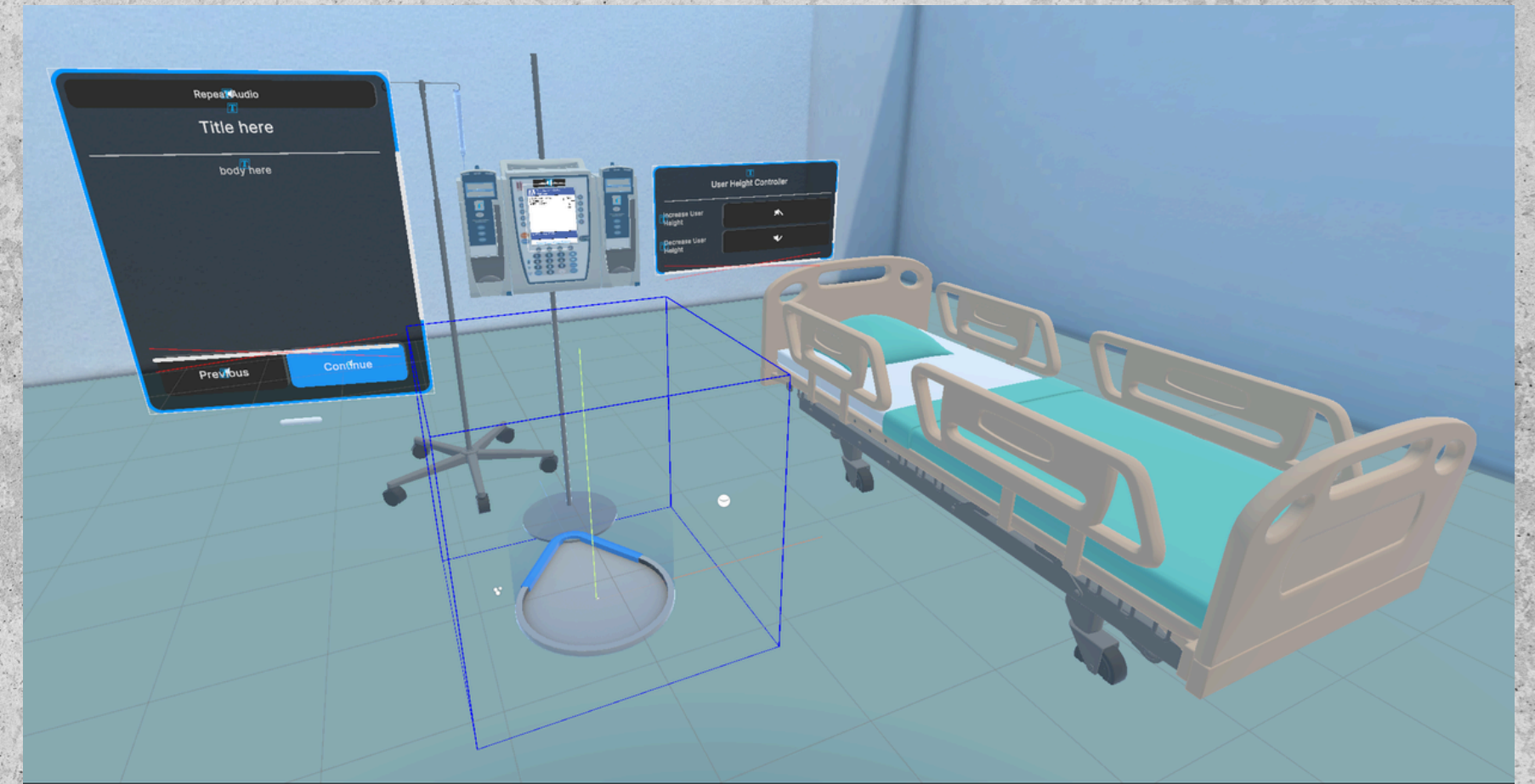
Stage 2

Interactable buttons--change screen based on input and button pressed.



Stage 3

Add 3D model of IV Pump and reflect changes to buttons.



Stage 4

Add narrator window with voice narration.

5 MIN

DEMO

PILOT STUDY

Methodology

Third and fourth-year nursing students were invited to try out and fill out a survey to help understand the impact of the prototype.

Participants were given a quick tutorial on using the VR adjustments for the first time.

After trying out the prototype, participants were encouraged to take the survey.

PILOT STUDY

Results

Visual and sound feedback was found very useful when navigating the machine.

Participants **became more interested** in learning about the machine through VR Training.

All participants found it **helpful to train through the VR simulation** method.

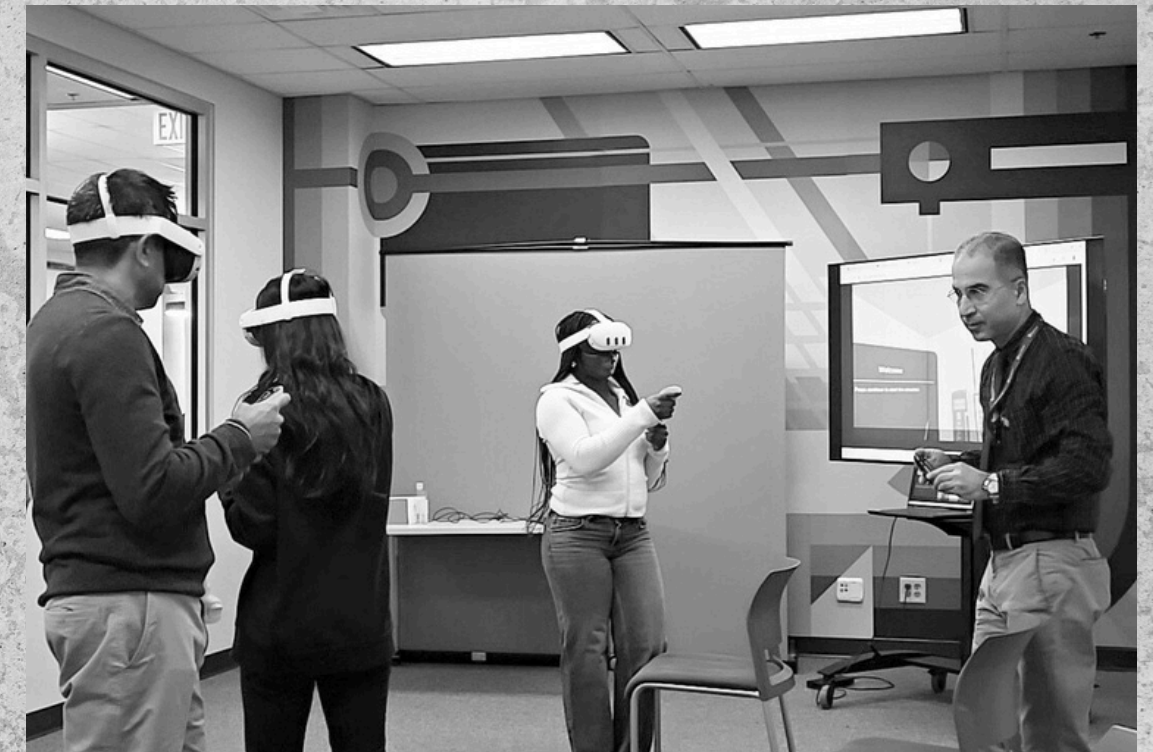
Testimonials

"It was an awesome experience..."

"...it was very easy to understand and very adaptable..."

"...it was very cool and made me more interested in learning more about it."

"This will be an great way to learn for future nursing students for sure."



PHASE 3 RESEARCH



SCALED STUDY

1. Human Ethics Approval (REB Ethics)

To create an official study, we applied for an REB Ethics approval.

2. Data Gathering

Once our REB Ethics was approved, we started recruiting participants and performed the testing. Participants were encouraged to complete an anonymous questionnaire but not required.

3. Data Analyzation

Analyze gathered data and bring insightful findings.

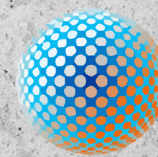
ACHIEVEMENTS



**WNRCSN
CONFERENCE 2025**

UBC OKANAGAN CAMPUS, KELOWNA BC
MAY 22 - 23, 2025
PRECONFERENCE: MAY 21, 2025

**ALBERTA
INNOVATES**



**Immersive Learning
Research Network**



**MacEwan
UNIVERSITY**

- iLRN 2025 paper accepted
- Poster Presentation for the WNRCSN Conference 2025
- MacEwan Ventures Pitch Competition 3rd Place
- Alberta Innovates Research Grant 2025/26
- MacEwan USRI Project Grant

FUTURE WORK

GOALS

Add the Blood Glucose Machine

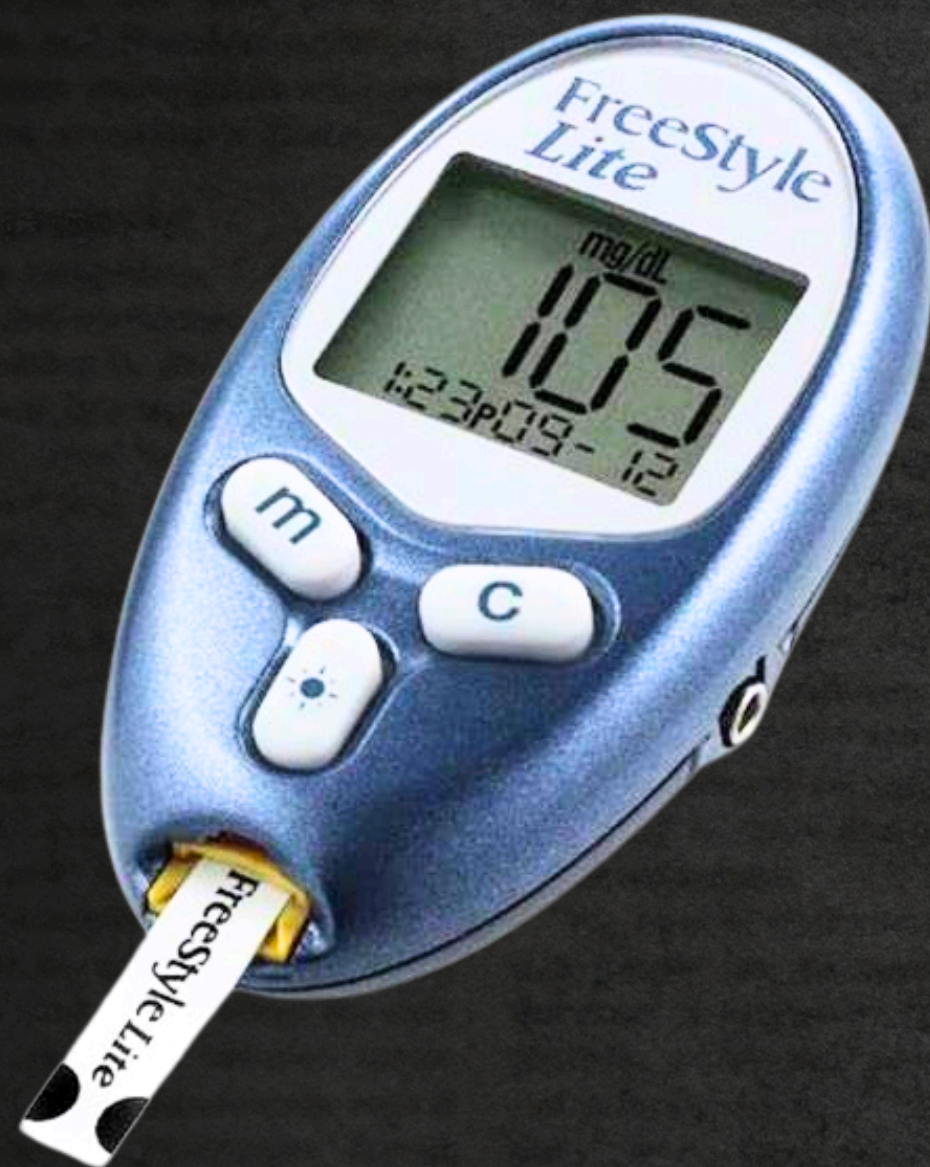
Creating a machine would show how flexible and scalable VR for nurse training is.

Improve UX/UI and add features

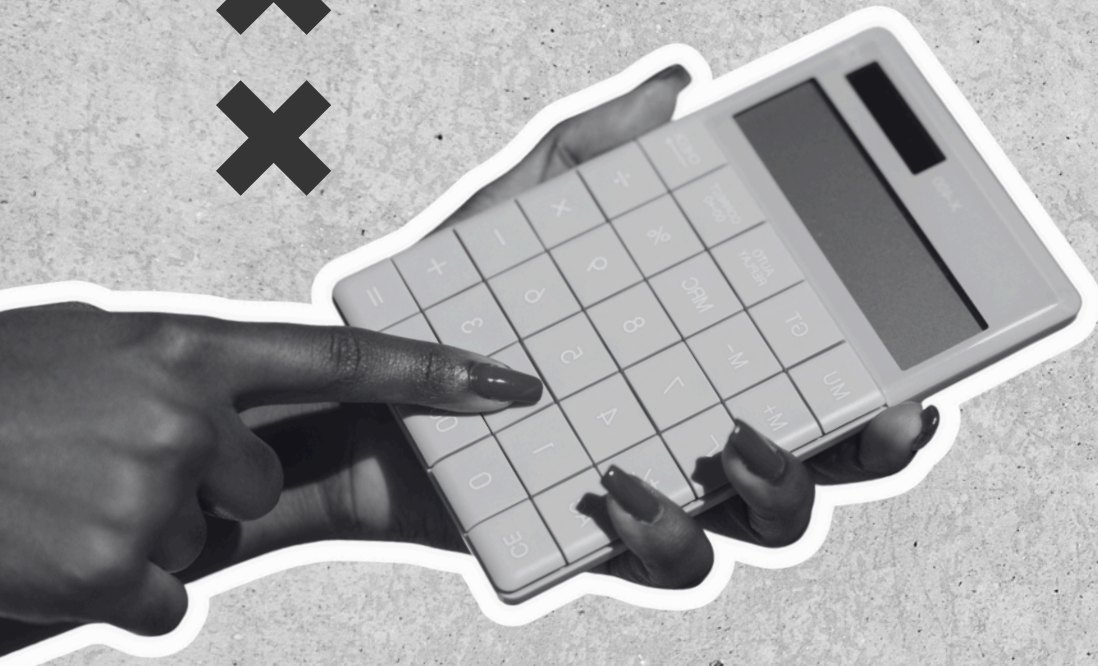
Our current prototype is our MVP, we would like to add and enhance on to the current program. So that it can be used without outside help and add more complex tasks.

Research/Report

Continue to gather data, analyze, and improve based on findings. Possibly write a paper.



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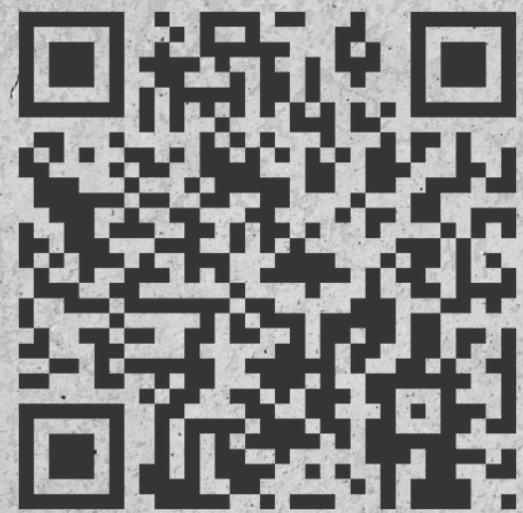


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