Gathering User Experience for Motion Controls in a Virtual Learning Environment

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First Term Leader

Designer, Prototyping, Designed the playtest

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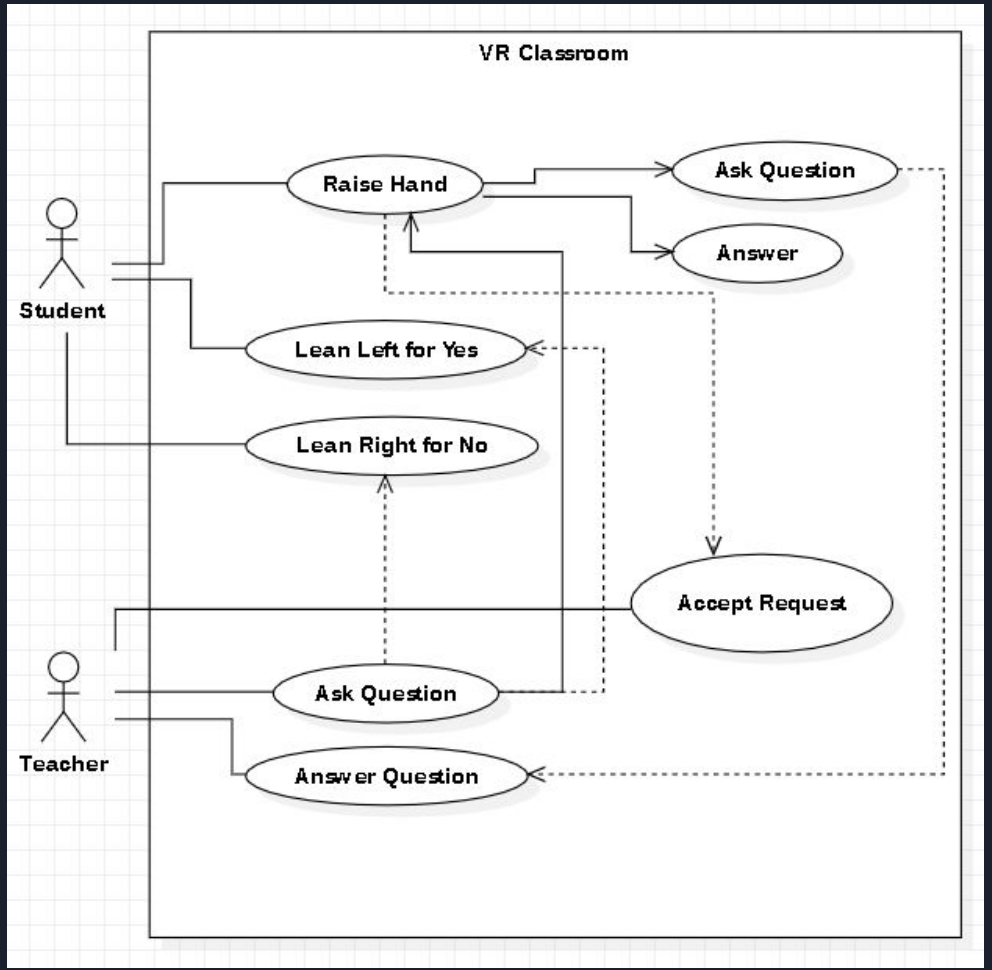
Second Term Leader

Programmer, Designer, Lead the Playtest

Use Case

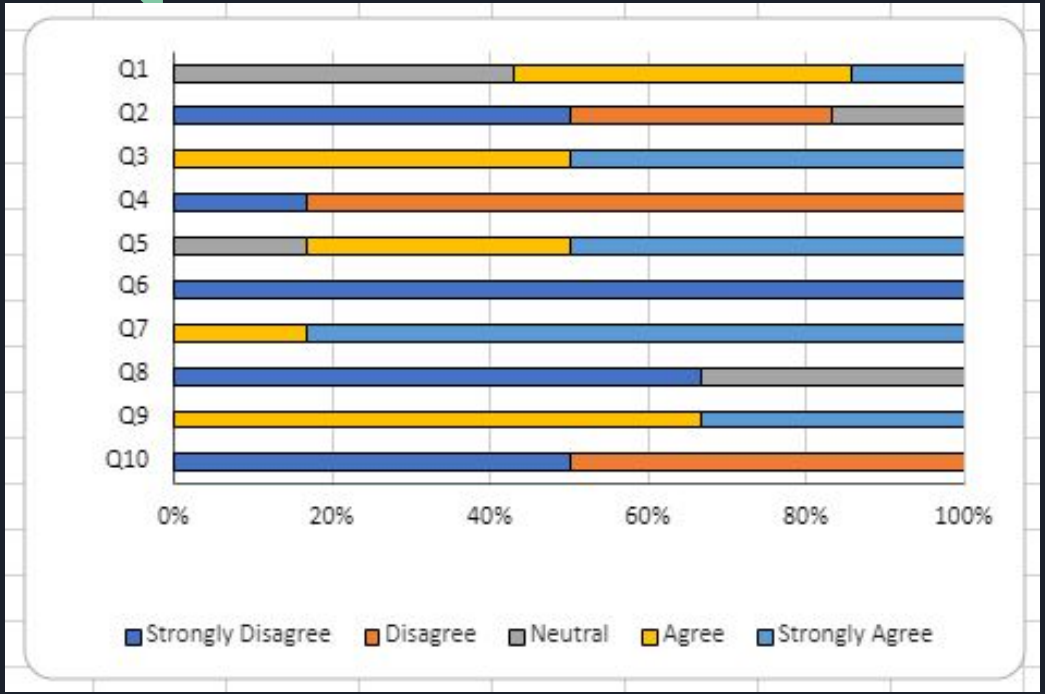
- **Student Based (Our core design)**
  - Raise Hand
    - Ask Question
    - Answer/Talk
  - Answer Questions with Leaning
- **Teacher**
  - Ask Question
  - Answer Question
  - Accept Hand Rasie



Demo

https://www.youtube.com/watch?v=xuIbVLupsjM

System Usability Scale Analysis



- **85.4%** SUS Score average
- Most of the points off came from users who:
  - Were not very interested in using the system frequently
  - Found it unnecessarily complex
  - Cumbersome to use

Our Thoughts

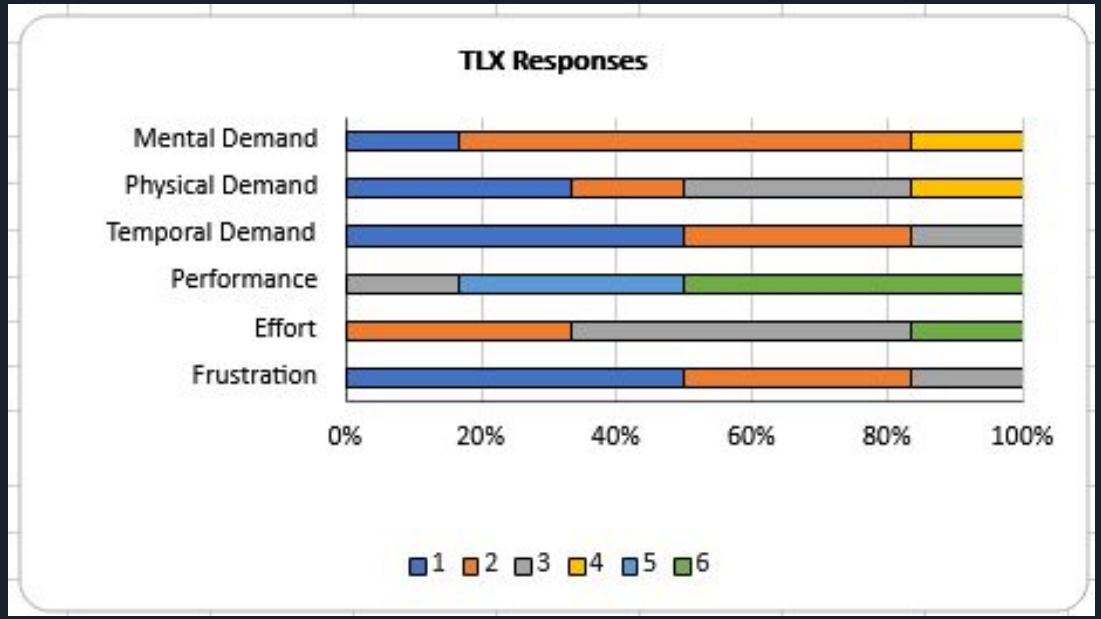
- Strong overall performance in the other SUS categories
- Users especially thought the systems were well integrated

NASA TLX Analysis

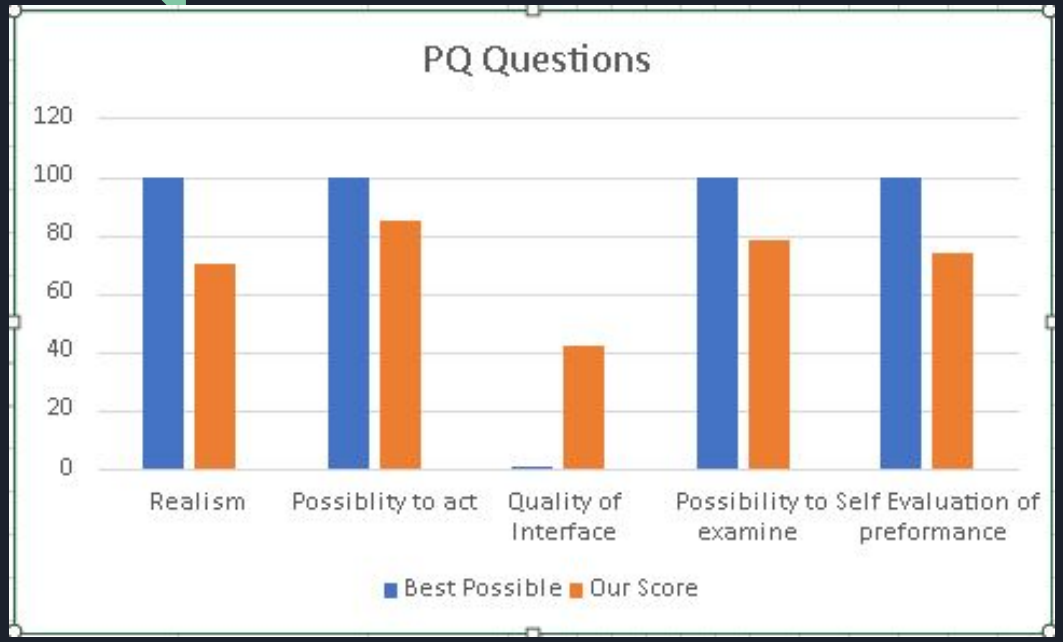
- Lower end of Mental Demand
- Somewhat cumbersome and physically demanding
- Low Temporal Demand
- Strong Performance
- **Mixed Reviews** on Effort Required
- Limited Frustration

Our thoughts

- Head lean required too much effort
- Hard to maneuver the heavy headset
- Overall ran very well



PQ Analysis



- 70% of the interaction felt natural
- 85% positive on the interaction
- 60% on the quality (REVERSED)
    - Head lean affected the control experience
    - Made it harder to accomplish the task
    - Slight delay in understanding
- 80% ability to examine the environment
- 75% ability to adjust to the environment and tasks

Our Thoughts

- More of a developer test build
    - Interactions weren't fully taught to the player
- Head lean again was a problem
    - Distracting, heavy
- Overall pretty solid experience

Other Feedback Received

- Users were asked if they had any further questions, comments or concerns regarding the system and notes were taken.

- Convert head lean to nod or shake for a more natural physical interaction.
- Reading text could be difficult, leading us to the potential of better fonts for accessibility.
- Confirm buttons may lapse immersion, but will decrease physical strain on the users.
- Functionality was impressive, and with a the strong base, few adjustments will be needed.

Limitations, Takeaways, and Future Work

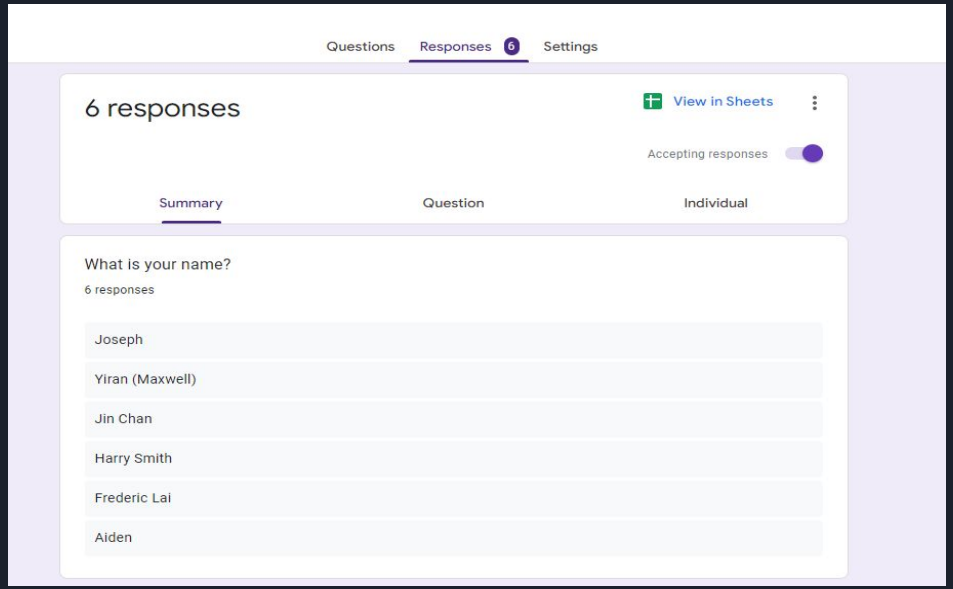
- Changes to scope regarding both teacher and student functionality.
- Developer build - Not truly set up for the user, had to explain
- Limited amount of data, with only 6 participants.
-
- The most important piece of information we learned was that our concept was more physically demanding than we originally thought.
  - Need to pivot to a head shake
  - Fix some text accessibility

- Refining the ability to interact with the world.
- Smooth physical movements to become more natural.

Appendices

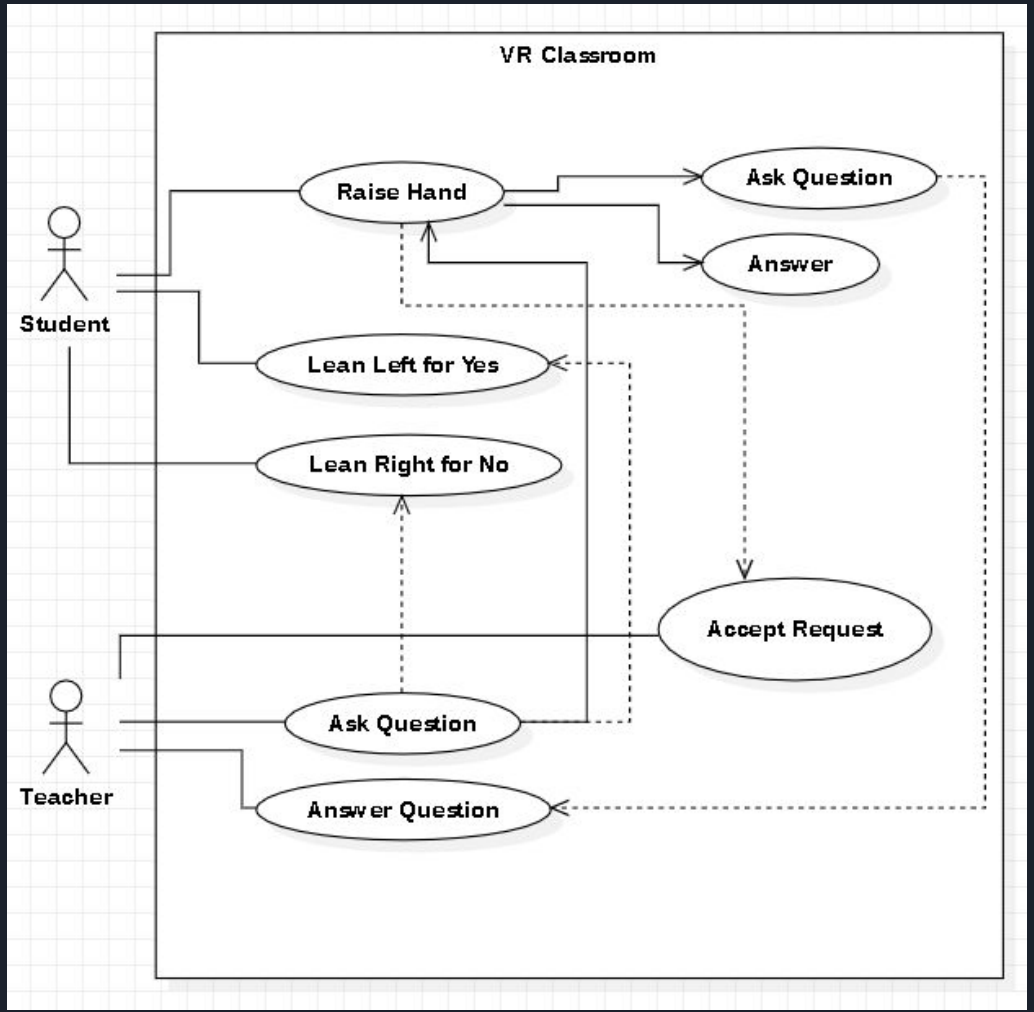
Our Survey Link: https://forms.gle/VJKCzPkaokuJWSgy5

Responses Proof:



Our Excel Data: Sus Report - VR Class.xlsx (Need to use Ontario tech email to view)

Use Case Diagram



Sus Data

Sus Score Report

Paticipant	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
	I think tha	I found the	I thought t	I think tha	I found the	I thought t	I would im	I found the	I felt very	I needed t	Score	
1	4	2	5	2	4	1	5	1	4	2	85	
2	3	2	4	2	3	1	4	3	4	1	72.5	*
3	3	3	4	2	4	1	5	3	4	2	72.5	*
4	5	1	5	2	5	1	5	1	5	1	97.5	
5	4	1	5	1	5	1	5	1	5	1	97.5	
6	4	1	4	2	5	1	5	1	4	2	87.5	
										Average	85.41667	

Sus Answers for the chart

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Strongly Disagree	0	3	0	1	0	6	0	4	0	3
Disagree	0	2	0	5	0	0	0	0	0	3
Neutral	3	1	0	0	1	0	0	2	0	0
Agree	3	0	3	0	2	0	1	0	4	0
Strongly Agree	1	0	3	0	3	0	5	0	2	0

NASA TLX Data

	Q1	Q2	Q3	Q4	Q5	Q6
responses	2	3	2	5	3	2
	2	2	2	3	2	1
	2	4	3	5	3	3
	4	1	1	6	3	1
	1	1	1	6	6	1
	2	3	1	6	2	2
	1	**2**	**3**	**4**	**5**	**6**
Mental Demand	1	4	0	1	0	0
Physical Demanc	2	1	2	1	0	0
Temporal Demand	3	2	1	0	0	0
Performance	0	0	1	0	2	3
Effort	0	2	3	0	0	1
Frustration	3	2	1	0	0	0

PQ Data

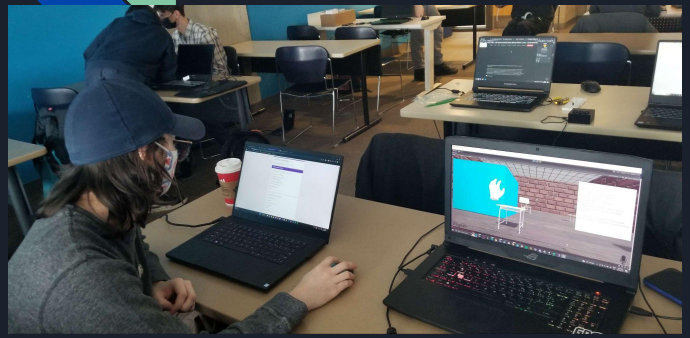
	Scores to count	Total	Best Possible	Average	Our Score
Realism	3 + 4 + 5 + 6 + 7 + 10 + 13	206	49/49	34.33333333	70.06802721
Possiblity to act	1 + 2 + 8 + 9	142	28/28	23.66666667	84.52380952
Quality of Interface	(all reversed) 14 + 17 + 18	53	0/21	8.833333333	42.06349206
Possibility to examine	11 + 12 + 19	99	21/21	16.5	78.57142857
Self Evaluation of preformance	15 + 16	62	14/14	10.33333333	73.80952381

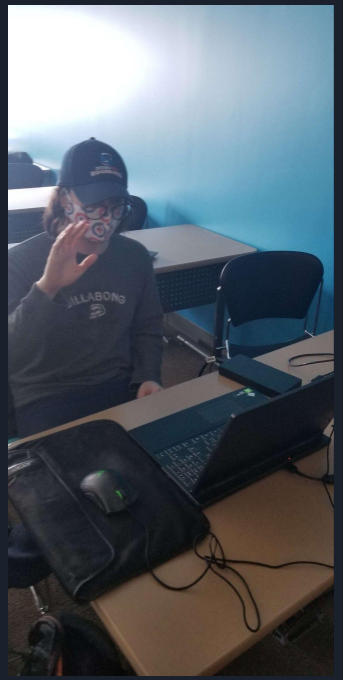
Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	7	7	6	7	1	5	4	7	5	3	7	5	7	6	5	4	3	3	6
	4	4	5	2	4	1	5	3	4	3	4	3	4	2	2	3	3	3	4
	6	6	3	5	3	2	6	6	5	4	4	6	2	1	2	6	5	5	4
	7	7	6	6	6	6	7	7	7	7	7	6	6	6	6	6	1	1	6
	6	6	5	6	5	6	5	6	7	4	6	6	7	7	7	7	1	1	7
	6	6	6	6	5	6	6	6	7	7	7	4	6	1	7	7	2	2	7

Open Feedback (open Conversation after the user tested)

- Great progress and design so far
- Impressed with the quality and functionality of the prototype
- Hard to lean
  - Too far to lean
- Add text accessibility
- Add a confirm button
- Headset is heavy to lean with

Our Participation with others





Our Participants