



Emerging Technologies: Final Project Presentation

Christian Riggi:100752293

Aiden Gimpel: 100740094



Abstract

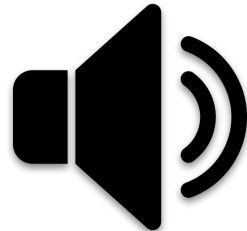
- **Process Overview**

- Design Thinking
- Gantt chart
- Research
- First Idea
- BodyStorming
- Prototyping
- Testing
- Final Changes



Introduction

- Clear underlying fact: **Feedback for spatial awareness in VR is mainly visual**
 - This poses problems to people who are visually impaired that can't perceive visual feedback
- **Our solution:** a working “Wizard of Oz” prototype that uses **audio and haptic feedback** to increase the **confidence** and level of **spatial awareness, for visually impaired users.**
- Initially a working solution was created which allowed us to constantly iterate on our design and improve it based on **various feedback, research from other solutions** and **surveys** from users.



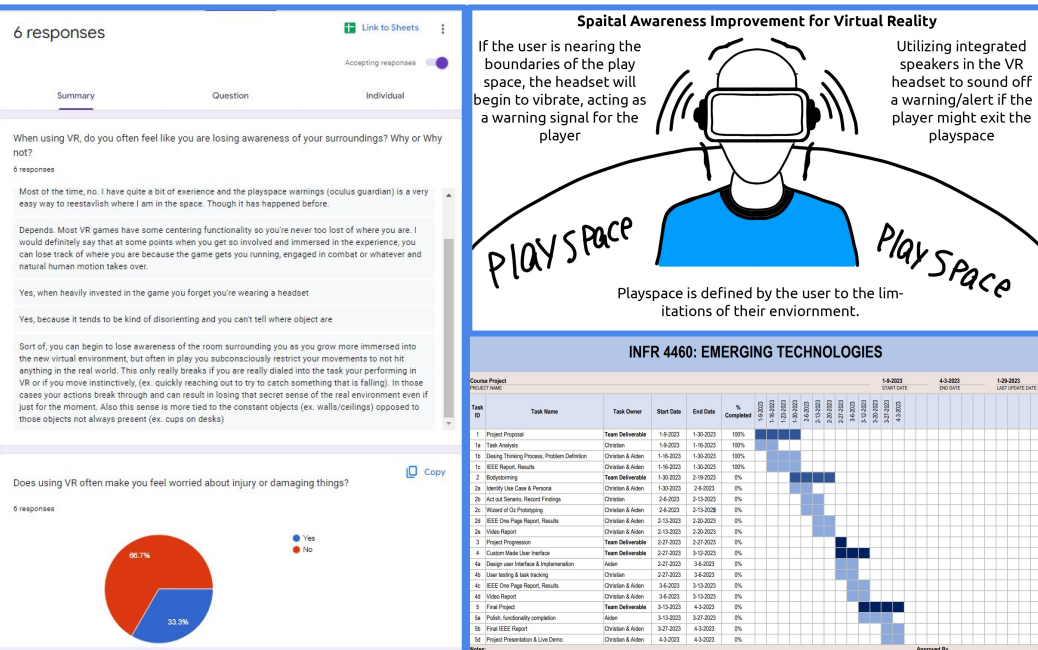
Methods

Ideation

- Design Thinking Process
- Gantt Chart
- Research

Bodystorming

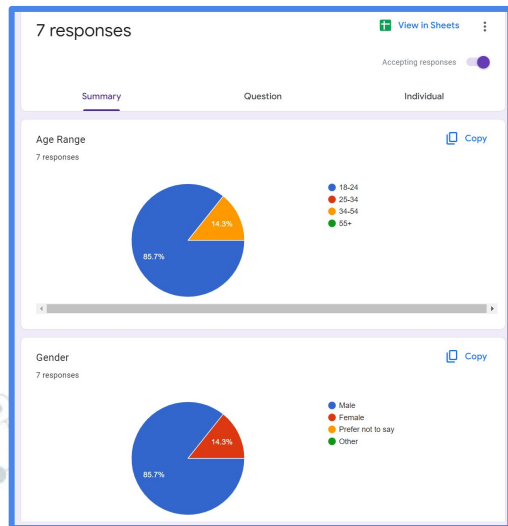
- Use Case
- Persona
- Actor-Observer



Methods (Cont.)

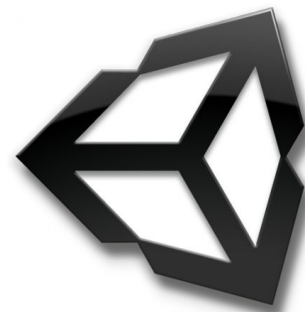
Testing

- SUS, TLX, PQ Survey
- User Feedback
- Final Changes



Prototype Creation

- Unity
- Meta Quest 2
- Iterative Design
 - Updated Sounds
 - Added/Removed Features
 - Increased User Control

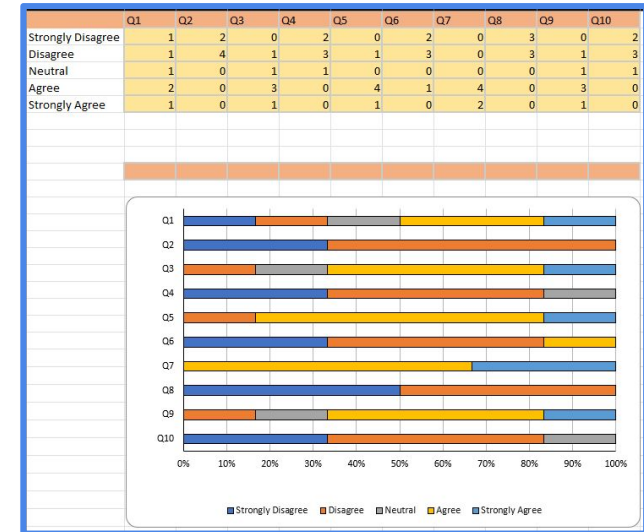


Results

System Usability Scale (SUS)

- SUS average from 6 participants was **74.58**
- Odd Numbered Questions (Positive Tone)**
 - Majority had higher scores, praising the project and its functionality
- Even Numbered Questions (Negative Tone)**
 - Lower scores, as most participants felt comfortable using the system and weren't as stressed
- However, some users felt there were **inconsistencies** with the system
 - Spatial & Dynamic audio bugs**
 - Difficulty using the system rather than ease.

Participant	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Score
1	I think that I will find the system useful	I think that I would like to use the system frequently	I think that I would like to learn about the system	I think that I would like to use the system frequently	I think that I would like to use the system frequently	I think that I would like to use the system frequently	I think that I would like to use the system frequently	I think that I would like to use the system frequently	I think that I would like to use the system frequently	I think that I would like to use the system frequently	52.5
2	4	1	5	1	5	1	5	1	5	1	97.5
3	2	1	3	3	4	2	4	2	3	3	62.5
4	5	2	4	1	4	2	5	1	4	1	87.5
5	4	2	4	2	2	2	4	2	4	2	70
6	3	2	4	2	4	1	4	1	4	2	77.5
Average:											74.58



[illegible]

NASA - TLX

- Average mean from 6 users: **31.94**
 - (Score was lower do to reversal in values on spreadsheet, so we were not concerned with lower value)
- **Diagnostic Subscores**
 - High performance values: **73.33**
 - High temporal value: **43.33**
 - Users temporal effort and time to complete a task were not as fast as expected

Raw/Unweighted	
Overall	19.17
Diagnostic Subscores	
Mental	28.33
Physical	23.33
Temporal	43.33
Performance	73.33
Effort	21.67
Frustration	31.67

[illegible]

Results (Cont.)

Presence Questionnaire

- Average score: **132.86 / 168**
 - Overall very **positive results** on things related to presence
- Average Score per category ranges from **75% - 83%** out of 100%
 - Positive results for each category
- Some categories viewed **lower** such as ***Possibility to Examine***

	Related Questions	User 1	User 2	User 3	User 4	User 5	User 6	User 7	Average Per Category
Realism	3 + 4 + 5 + 6 + 7 + 10 + 13	31 / 49	46 / 49	31 / 49	41 / 49	40 / 49	44 / 49	39 / 49	38.85714286
Possibility To Act	1 + 2 + 8 + 9	20 / 28	28 / 28	19 / 28	25 / 28	22 / 28	25 / 28	23 / 28	23.14285714
Quality of Interface	14 + 17 + 18	6 / 21	3 / 21	6 / 21	8 / 21	8 / 21	5 / 21	4 / 21	5.714285714
Possibility To Examine	11 + 12 + 19	13 / 21	15 / 21	15 / 21	18 / 21	15 / 21	16 / 21	20 / 21	16
Self-evaluation of Perform	15 + 16	8 / 14	14 / 14	12 / 14	12 / 14	11 / 14	13 / 14	12 / 14	11.71428571
Sounds	20 + 21 + 22	15 / 21	19 / 21	14 / 21	17 / 21	16 / 21	18 / 21	16 / 21	16.42857143
Haptic	23 + 24	10 / 14	13 / 14	11 / 14	12 / 14	11 / 14	12 / 14	11 / 21	11.42857143
Total (Out of 168)			112	153	117	138	128	144	138
Average	132.8571429								

Discussion and Conclusion

- Importance of the **user** and their **needs**
- **Constant iteration** is important to keep up with users needs
- Narrowing down **important feedback** and **picking only useful ideas** that are important



Takeaways