



# **Exploring the Effect of Personalized Virtual Reality**

## **Serious Game for Stroke Rehabilitation**

RVA 2025/2026 - Final Presentation

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# INTRODUCTION

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## Why this Project?

- How does **stroke** impacts our society?
- Why **VR** for rehabilitation?

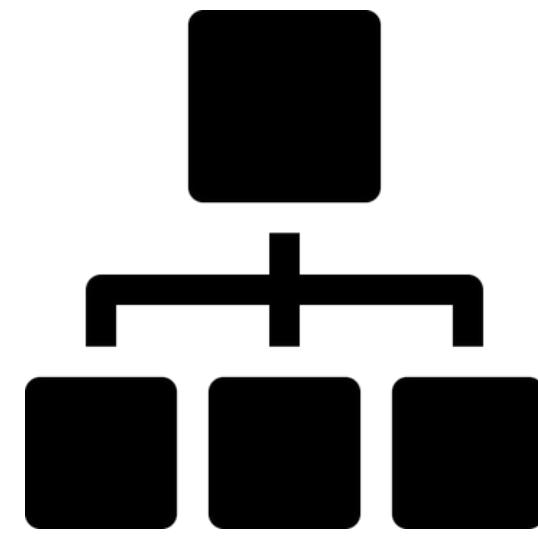


# OBJECTIVES

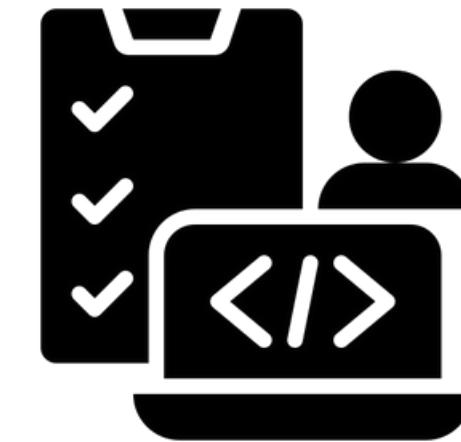
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**Create at least 2 VR  
mini-games**



**Create the personalisation's  
structure**



**Test with users**

# VISION

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**A functional VR prototype developed for rehabilitation**

**A new, more motivating and enjoyable form of rehabilitation**

**Contribute in VR Rehab Field**

# USER STORIES



**Manuel**

- 72 years old
- Plumber
- 40 years of experience
- Retired

As a **stroke survivor**, I want to **engage in enjoyable and motivating activities** so that **I can stay committed to my rehabilitation process.**



**Maria**

- 30 years old
- Physiotherapist
- Specialized in Stroke Rehabilitation
- 5 years of experience

As a **healthcare professional**, I want to **monitor my patients' progress in real time** so that **I can make informed adjustments to their therapy plans.**

# PROTOTYPE ENVIRONMENT

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## Country Fair

- Cultural resonance
- Emotional value
- Promoting an engaging environment

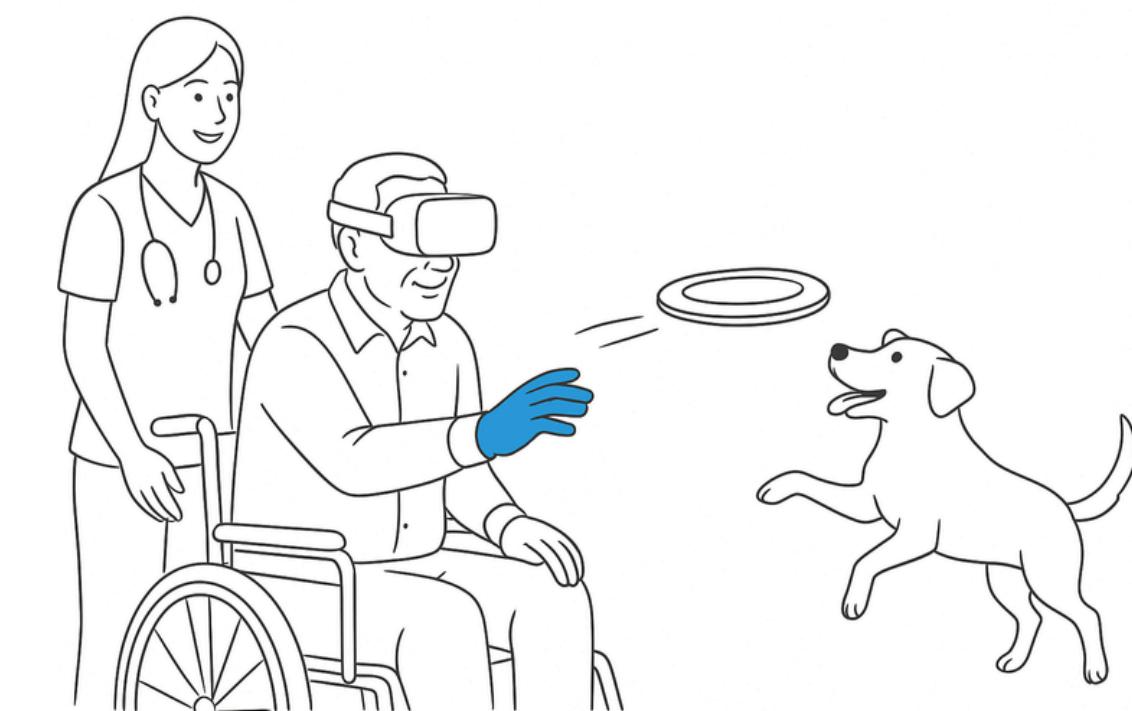


# PROTOTYPE DEVELOPED

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## Frisbee Game

- Throw Frisbee and show trajectory
- Display the target area
- Dog's behaviour to catch the frisbee and deliver it to the player
- Score and streak displayed in the UI
- Sound feedback



# PROTOTYPE DEVELOPED

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## Archery Game

- Bow pull and arrow release
- Show arrow trajectory
- Balloon interaction and respawn
- Score and streak displayed in the UI
- Sound feedback



# TOOLS USED

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- Software: Unity, Blender and FMOD
- Hardware: Oculus Quest 3
- Libraries: Meta Interaction SDK, FMOD Unity, DotTween



## 3D Models:

- Balloons, bow and arrow – Rita
- Dog, frisbee, trees, bushes and stones – David
- Button – Meta
- Ferris Wheel and sheep – Poly by Google
- Fence – Quaternius
- Persons – J-Toastie
- Other models – sirkitree



# DEMO

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# USER EVALUATION - TASKS

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	Pessoa 1	Pessoa 2
<b>Tarefa 1: Selecionar um mini jogo para jogar</b>	12s	3s
<b>Tarefa 2: Voltar para a feira</b>	5s	8s
<b>Tarefa 3: Arrebentar 3 balões no jogo do arco</b>	11s	11s
<b>Tarefa 4: Marcar 1 ponto no jogo do frisbee</b>	53s	37s

# USER EVALUATION - FEEDBACK

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## **Overall Experience:**

- The mini game were fun to play
- The users felt they were in a country fair
- Liked the sound feedback
- Felt that the mini games needed a tutorial

# USER EVALUATION - FEEDBACK

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## **Frisbee mini-game:**

- The frisbee curved to much in the direction of the throwing hand.
- Instead of going to the user's exact position, the dog delivered the frisbee directly to the nearest outstretched hand

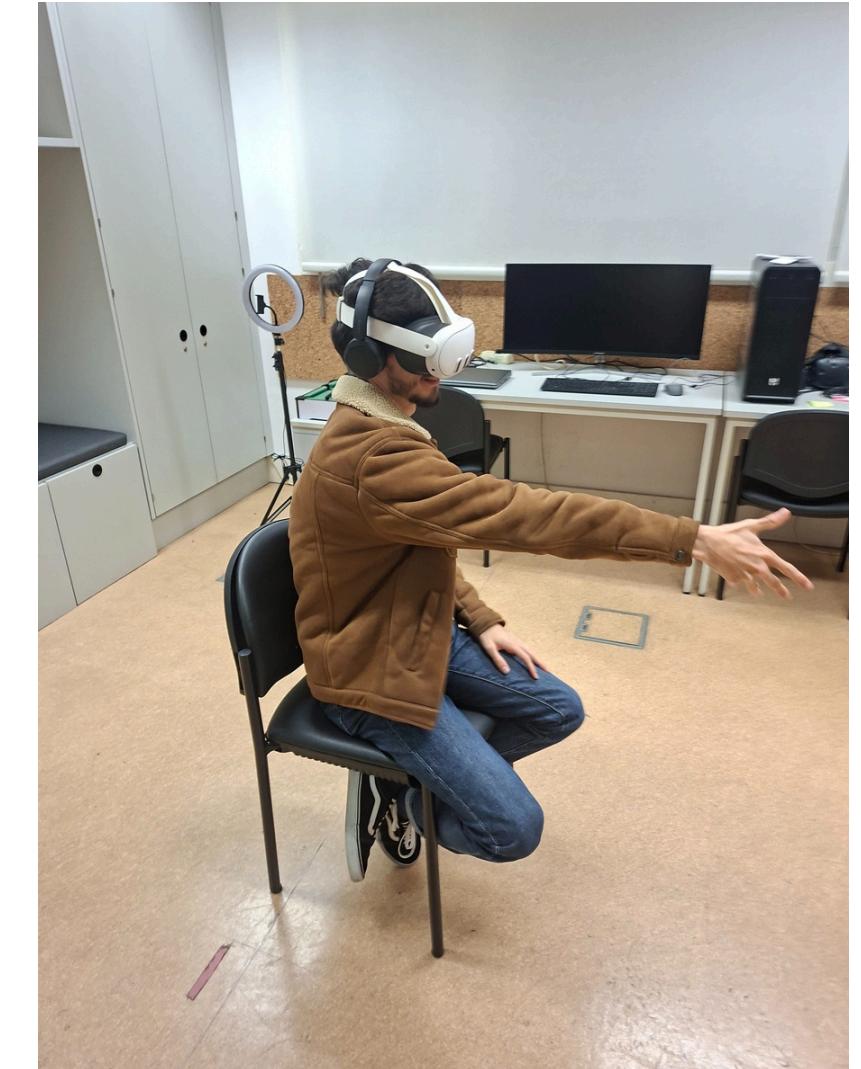
## **Archery mini-game:**

- Balloon Scoring: Considers texture (e.g., metallic) and legend plates, not just color.
- The arrow sometimes launches while the string is still being pulled.

# USER EVALUATION - OBSERVATIONS

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- Users felt amused while playing
- 1 user struggled to understand how to score a point in the Frisbee mini game
- There were no signs of any negative after effect



# EXPECTATIONS VS REALITY

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## Expectations:

- Mini games would be simple to implement
- No bugs at final presentation
- We would be able to test with several users
- No major technical issues

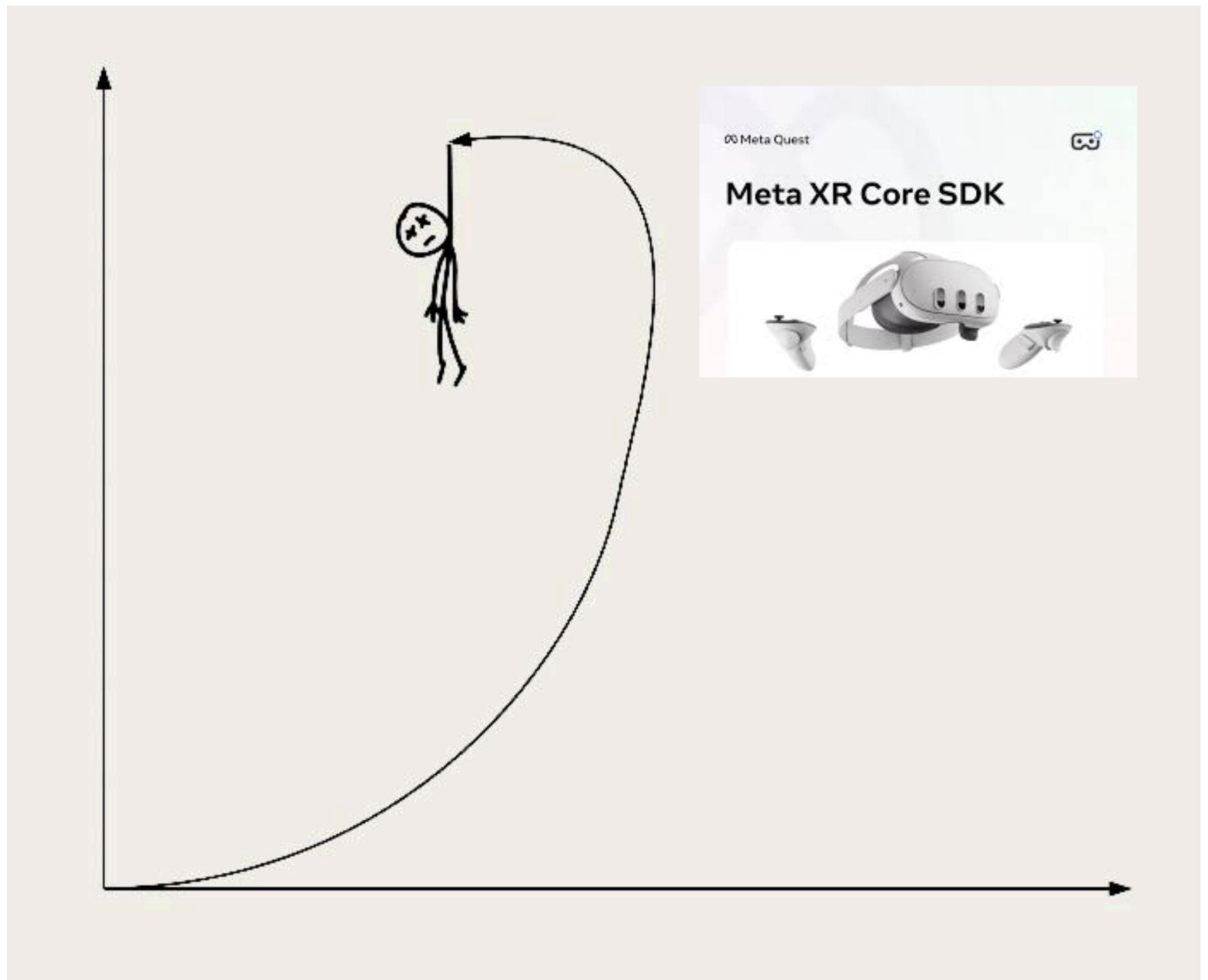
## Reality:

- Getting the physics right took longer than expected
- Minor bugs remained
- Tested with some users
- Overall no major difficulties were encountered

# MAIN DIFFICULTIES

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- Learn VR development in unity
- Hand tracking accuracy and stability
- Implementing and fine-tuning physics
- Debugging and testing in VR
- Headset management
- Find information in Meta SDK Documentation



# FUTURE WORK

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- Add a tutorial
- Create a system that adapts to user's performance
- Improve physics
- Improve gameplay
- Add more feedback

# **Thank you!**

Ana Rita Guimarães – 50%

David Palricas – 50%