

# UX design models alleviate VR motion sickness

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## 1 Abstract

Based on the theory of desensitisation therapy, a hypothesis is proposed: whether it is possible to help users improve their tolerance to VR motion sickness and reduce the likelihood of vertigo by targeting training on the five trigger behaviours of motion sickness. The user's level of acceptance was tested prior to using the VR programme, and during use the user was progressively challenged with items that were slightly more difficult than the initial level, eventually achieving the effect of no longer experiencing an allergic reaction when exposed to highly difficult items. A qualitative research method was used, with user interviews in the early stages. In the middle stage, we conducted user log tracking records, user journey map analysis, focus groups and invited users to participate in the design. Finally, we summarised user pain points for the design, invited users to conduct usability tests, and tested the data.

## 2 Literature review Previous treatment Study introduction

### ● Psychology and Cognitive Science - desensitisation therapy

**Desensitisation techniques**, rooted in psychological principles, Early research demonstrates that gradual exposure to VR environments can lead to reduced symptoms and improved tolerance.

### ● Medicine and Pharmacology - Protein, Vitamin C and antihistamines

Medications and pharmacological treatments are aim to modify physiological responses that contribute to the development of nausea, dizziness, and discomfort.

### ● Neurology and Neurobiology -

Neurobiological interventions aim to target the underlying brain mechanisms responsible for motion sickness symptoms.

### ● Design - User Experience Design and Interaction Design



## Research question & Hypothesis 3

### ● Research question:

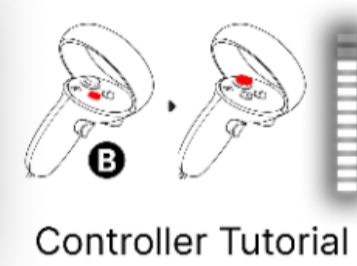
What user experience design strategies can be employed to mitigate and reduce VR motion sickness, enhancing user comfort and engagement in virtual environments?

### ● Hypothesis

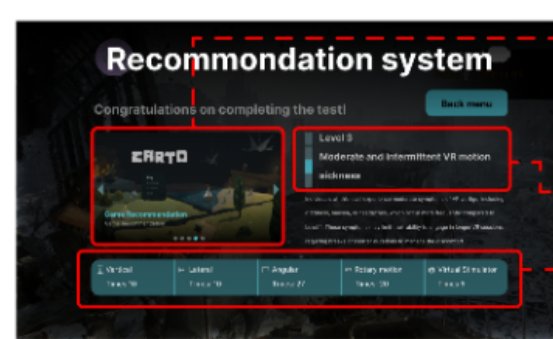
Implementing a targeted desensitization protocol within virtual reality experiences, where users are systematically exposed to progressively challenging motion scenarios. Whether it will achieve the purpose of reducing the symptoms of VR motion sickness, enhancing the sense of presence and comfort, thereby improving the overall user experience and increasing the user's tolerance to motion-intensive virtual environments.

## 5 Solution & Design

### 1 Pre: VR Motion Sickness Level Test



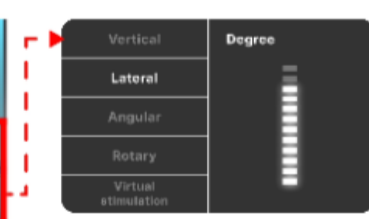
- 1. Marker points have been recorded
- 2. Press and hold for 3 seconds to cancel the last record.
- 3. Successful cancellation of previous record



- 1: Recommend the suitable VR product according to the user level
- 2: User VR Dizziness Levels
- 3: Record the frequency and cause of triggers

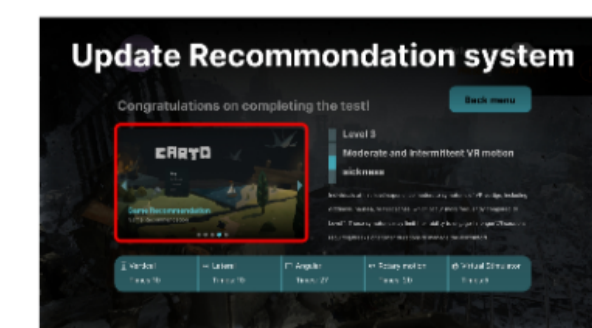
### 2: During VR use

#### Marking function, therapy tutorials

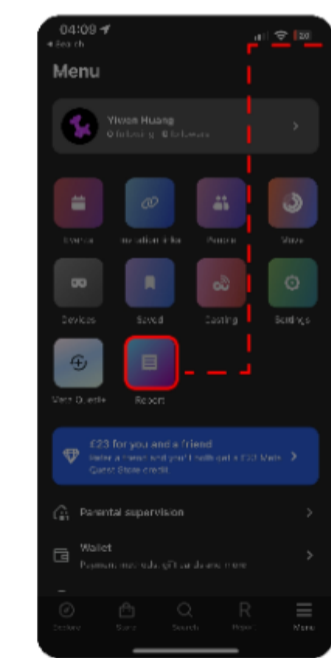


Mark the type and the degree of dizziness

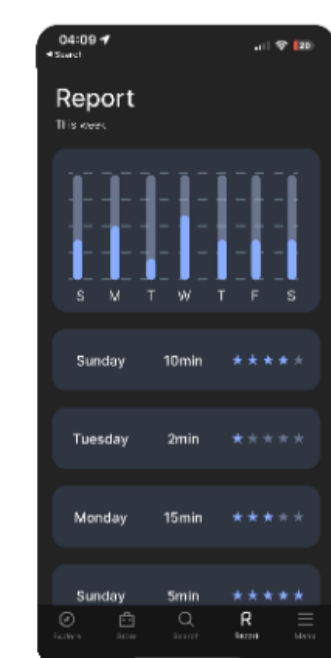
Ask the user why they stopped and recommend professional alleviation methods



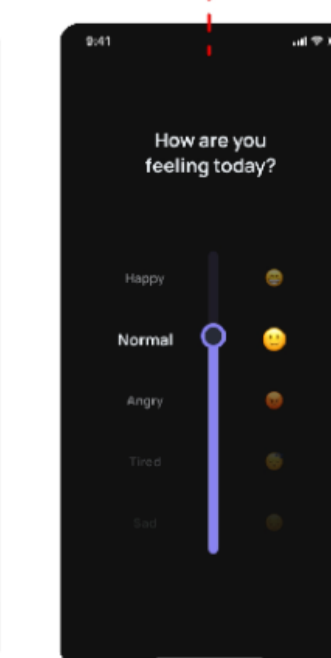
### 3: After VR use collecting user feedback and modifications



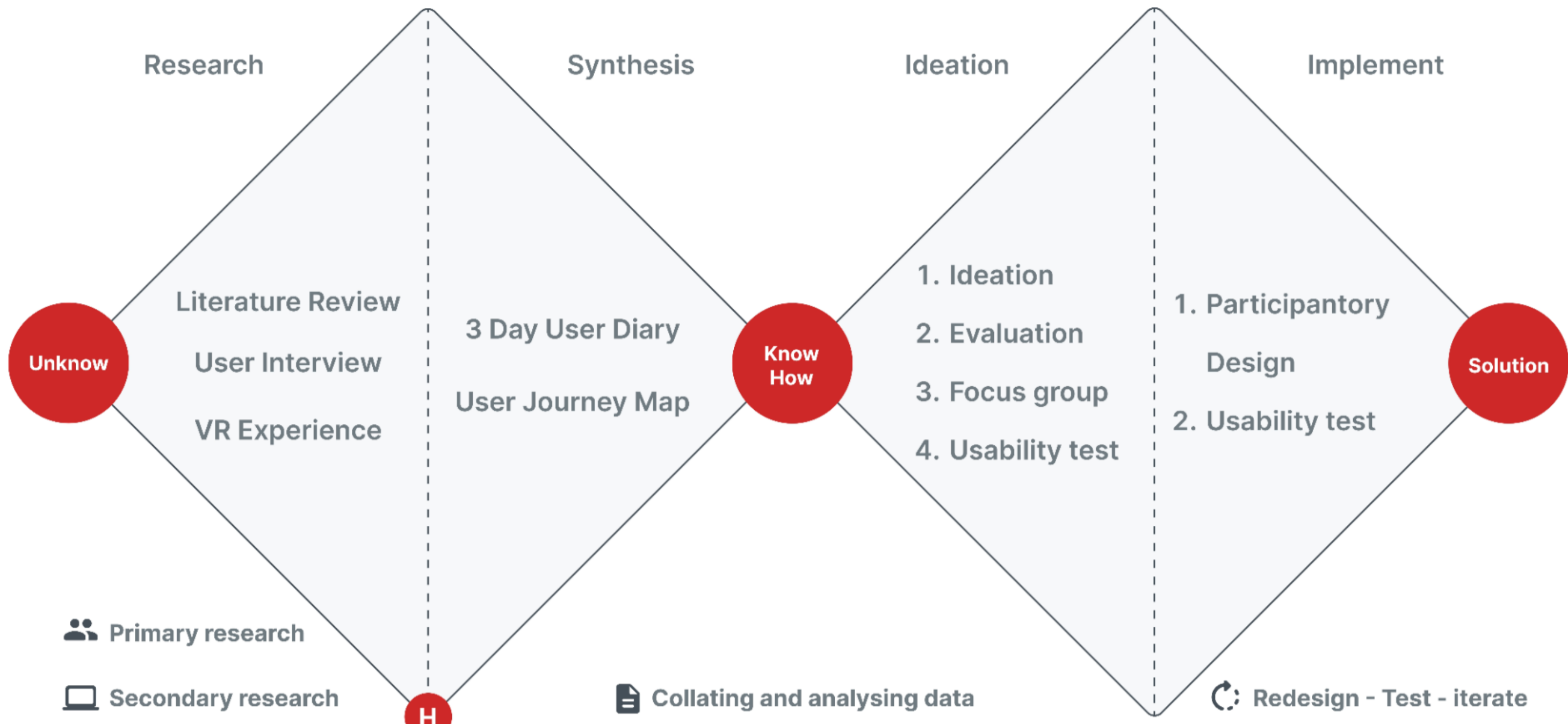
Add recording function to the Oculus App. Users can view their treatment history, as well as their dizziness level.



Scoring at the end of each therapy session



## 4 Process & Methodology



**Review existing academic research and products and propose a research question.**

Literature Review : Discover the **factors** affecting VR motion sickness and treatment of it

User interviews: **Exploring user perspectives** and gaining insights into their experiences and concerns related to VR motion sickness.

VR Experience: Provide VR products for users to **experience** and capture their feelings, incorporating literature research and **recording user feedback**.

**Testing whether the hypothesis is valid**

User diary: Over a three-day period, recording the users' exposure test usage experiences helps to understand how symptoms evolve over time and identify specific triggers.

User journey map: Creating this map helps **visualize pain points and opportunity points** in the user experience, enabling you to pinpoint critical areas for improvement.

**Hypothesis is valid**

Focus group: Conducting in-depth focus group discussions allows you to delve deeper into users' experiences, **gather qualitative feedback, and validate the pain points and opportunities** identified in the user journey map.

Usability test: Build **low-fidelity models** and invite users to participate in testing. **Remove and add functions** after collecting the feedback.

**Collect user feedback and redesign, test, and iterate. Complete the final design**

Participatory design: Involving users in the software design process ensures their needs and preferences are considered, potentially leading to more user-centric solutions.

Usability testing: Testing the software with users helps **identify any remaining issues** and iteratively refine the design based on user feedback, aligning with the user-centered approach of the Double Diamond model.

## Achievement

1. Successfully testing the hypothesis that VR motion sickness can be improved through user experience design combined with desensitisation experiments
2. Provides timely and professional support for users suffering from VR motion sickness

## Limitation

1. Due to the limited of time and energy, the sample size of the data was not enough, and more participants could be recruited to validate the study if it continues in the future. And test the effect of individual variability.
2. Eye tracking could not be tested during testing due to equipment issues.

## 6 Discussion