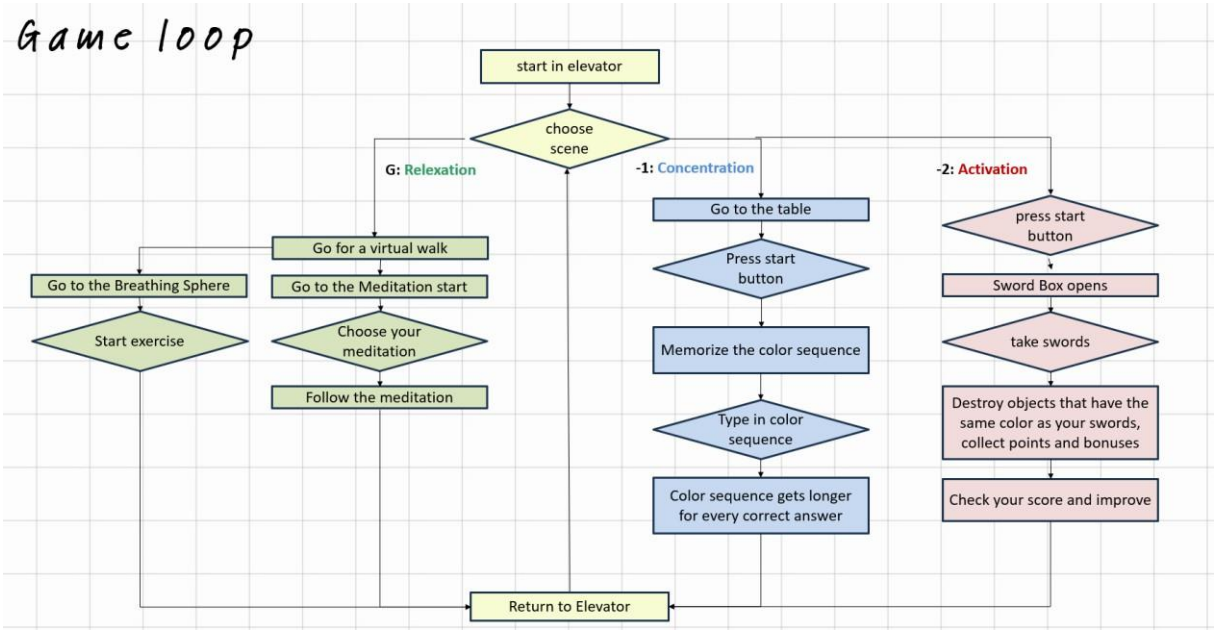
Zen Focus VR

Fundamental Concept

The vision for Zen Focus VR is to create an immersive virtual reality application
that empowers users to reset, refocus, and recharge. We envision an engaging platform that tailors experiences to individual needs, allowing users to select from various environments that cater to relaxation, concentration, or physical activation. Our ultimate goal is to enhance the user's well-being by fostering mindfulness and encouraging healthy habits, making it easier for individuals to incorporate moments of peace, focus, and movement into their daily routines.



Tech Stack

Hardware:

- Device: Pico 4
- Operating System: Android
- Maximum Resolution: 4320 x 2160 pixels (4k)
- Refresh Rate: 90Hz
- Field of View: 105°
- Mode: Standalone
- Tracking: 6 DoF (Degrees of Freedom)

Software:

- Unity Editor Version: 2022.3.47f1
- Pico SDK Version: 2.5.3
- The Application was built on the built-in pipeline of unity.

Why Virtual Reality?

The decision for a VR application comes from our focus for the user's wellbeing including their mental health mind and body. VR helps increase vividness and immersion which provides the user a greater sense of presence compared to 2D formats. With VR we can focus on creating an immersive environment as they directly contribute to the effectiveness of therapeutic interventions. VR can also evoke stronger emotions Its ability to evoke stronger emotions supports our goal of creating calming, engaging environments that promote relaxation and self-exploration in a safe setting (Frewen et al., 2020).

Meditation in VR enhances mindfulness by immersing users in controlled, distraction-free environments. VR's altered perceptions of space and time (Heeter, 1992) foster detachment from reality, enabling deeper meditative states and focused present-moment awareness, making it an ideal platform for mindfulness practice.

User Group

While Zen Focus VR can serve a diverse user group, we try to solve the problem of people who struggle to focus and stay engaged. People who fall into that category are persons who are stress prone and ADHD patients. ADHD patients often have lower baseline arousal levels, making engagement in low-stimulation environments difficult. This makes an application in VR an ideal choice where ADHD patients can directly benefit of the immersive nature of VR (Baur, 2016). The variety we offer in the different scenes of our application provide a range of option for different emotional or physical needs keeping the application interesting and individual to each person's use.

Spatial Interactions

Each scene in Zen Focus VR is carefully designed with specific interactions to align with its intended purpose, ensuring an immersive and meaningful experience for users.

Scene Transitions:

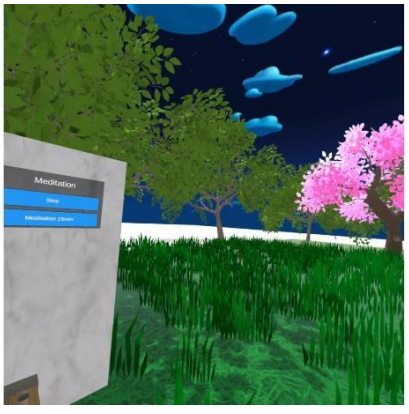
Transitions between scenes are managed using an elevator mechanism, ensuring smooth Scene change in a closed space to minimize motion sickness. This approach maintains user comfort and balance, critical considerations for VR experiences.

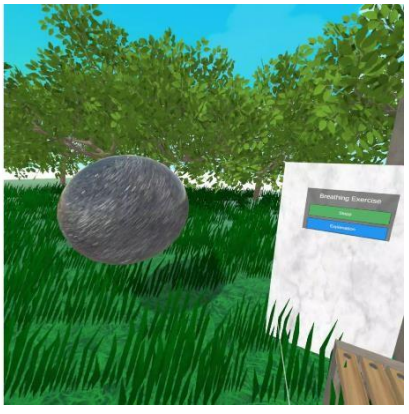

Relaxation Scene:

This scene offers a serene environment enriched with calming elements inspired by nature. Users can access a dedicated meditation area where the scene darkens when the meditation starts. This creates a tranquil atmosphere that encourages focus and mindfulness. This design reflects common meditation practices, such as closing one's eyes, setting intentions, and visualizing peaceful imagery. Whether the user meditates with their eyes closed or open is a personal choice, but the dimmed environment supports either preference.

Meditations also often emphasize body awareness and controlled breathing, which we incorporate into the scene through a Breathing Sphere that guides users in focusing on their breath in the 4-7-8 format. The breathing sphere scales up for 4 seconds to visualize breathing in, the sphere stops scaling for 7 seconds to visualize holding the breath and scales down for 8 seconds to visualize breathing out. This exercise is intended to help the user feel more calm afterwards.

Dynamic spatial audio further enhances the experience, featuring 432 Hz music, often associated with mental clarity and stress relief. The background music adopts to the user's position, providing a fully immersive and personalized auditory experience. The audio source is most prominent near the cherry blossom tree, creating a focal point for relaxation.



Activation Scene:

Designed to promote mobility and engagement, this scene integrates gamified elements such as floating cubes and dual lightsabers. Floating cubes approach the user, requiring them to focus and interact actively by striking them with the lightsaber with the matching color. This combination of dynamic visuals and physical movement fosters concentration, enhances coordination, and introduces an enjoyable exercise component.

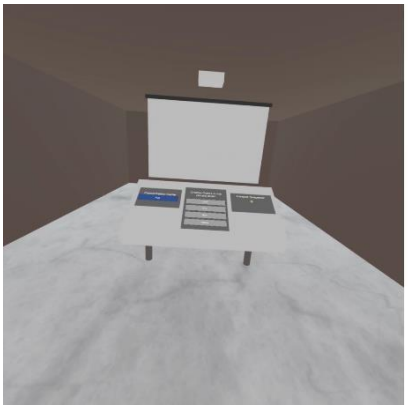
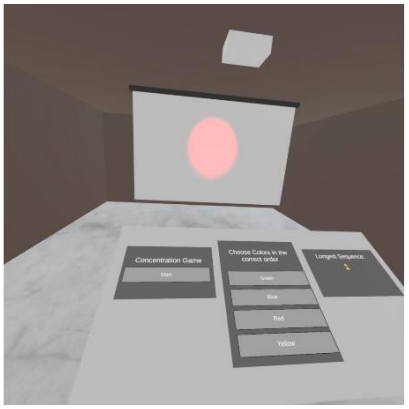
The player earns a point for every successful hit and can get bonuses for successful hit-serieses. Ten hits in a row 10 extra points, 20 hits in a row 20 extra points and so on till 100. Therefore 650 points can be achieved if a player manages to destroy all 100 spawned Cubes. If the Player misses a cube, it will be destroyed in the Destroy-Cube-Area which also resets the hit-series count for the bonus. Over time, the time between cube-spawning's are reduced and the cubes get faster to increase difficulty. These mechanisms should increase the gameplay enjoyment and motivate the player to move and improve.

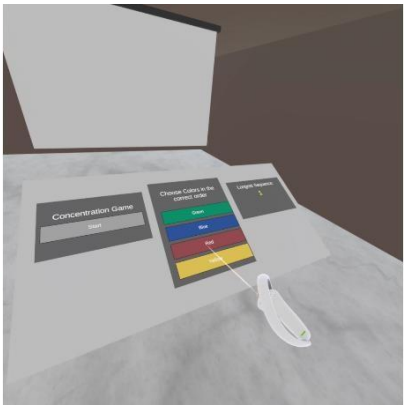


Concentration Scene:

The initial idea was to create a game to improve the player's concentration with stacking blocks according to a shown blueprint. During the development phase the idea came up to build a game that also improves the memory of the players, which led us to the following idea.

After starting the game a color sequence is played which the player needs to memorize. After the sequence was shown the user can type in the memorized sequence with the color-buttons. When the sequence was correctly entered, there is a positive audio feedback and the sequence gets one color longer until the user fails. If the user fails to enter the correct sequence, a fail-tone is played, the game resets and the user can start the game again with a click on the start button. The user can see the length of the longest memorized sequence of his latest try, which should animate the player to improve his result.



User Experiment

To assess the usability of Zen Focus VR, we conducted a structured usability test with focus on evaluating user-friendliness, functionality, and the overall user experience.

The Objectives:

1. To determine how intuitive and engaging the user interface is.
2. To identify areas of improvement in interaction design and features.
3. To assess the effectiveness of the relaxation and activation scenes.

Test Group

To ensure our application addresses its intended pain points, we aim to find participants from a variety of demographics, as stress, concentration, and activation challenges are prevalent across diverse groups. To evaluate whether our VR implementation effectively reduces stress and improves concentration and activation, we will focus on individuals who experience these issues, aligning with our previously defined user group. Within this group, we will include participants with varying levels of tech literacy or experience with VR, as well as individuals from different age groups, including young adults, middle-aged adults, and seniors. This diverse approach would enable us to assess the application's performance across a broad spectrum of users.

Testing Method

We use the Think-Aloud Protocol combined with the System Usability Scale (SUS) questionnaire. The Think-Aloud method allows us to gain real-time insights into user's thought, frustrations, ambiguities as they navigate the application. We found that this method is effective to identify the pain points and usability issues. After completing the tasks, users are asked to fill out the SUS questionnaire, allowing us to capture observed behavior in a standardized format. This approach enables us to validate our observations through the SUS score.

Test Design

At the time of testing, the Relaxation Scene and Activation Scene were mostly complete, while the Concentration Scene had not been completed yet. Therefore we mainly test the relaxation scene, activation scene and the scene transitions with the elevator. We divided the Test in Tasks and Subtask for each scene. The test persons were given basic information about the Hardware functionality such as interacting with a button the right trigger needs to be pressed.

Relaxation Scene:

1. Start the Application:
   - Explore the scene
   - Walk around the scene and listen to the background sound
   - Identify the most relaxing spot within the scene
2. Meditations:
   - Start a mediation session (10' or 15' option)
   - Stop or pause the meditation using the "X" button on the right hand
3. Breathing Exercise:
   - Try the Breathing exercise

Elevator Navigation:

- Use the elevator to navigate to the Activation Floor.
- Handle the elevator buttons.
-

Activation Scene:

- Start the activation task.
- Pick up sword and play the game by hitting incoming cubes.
- Complete the game and view your score.

While the users were completing the task they were asked to think aloud. After completing the tasks the users filled out the SUS questionnaire.

Expectations

We anticipated that the implemented interactions would be perceived as intuitive and natural. That each scenes intended purpose was clear for the user. Such as being more calm after the relaxation scene or more awake and active after the activation scene. We could expect potential challenges with button navigation in the application. The activation scene should be perceived as fun and the users should remain confident in their movement while playing.

Results

Two usability tests were conducted with our peers form the UIED class. Ideally we could conduct the usability tests with the described test group in the future. The Feedback is as follows:

Relaxation Scene:

+ Meditations were perceived as helpful.
+ The breathing exercise's visual scaling feature was effective in helping users focus on their body and breathing
+ Starting and stopping meditation sessions was intuitive, and the pause option was appreciated.
+ The skybox transition to nighttime enhanced the meditation atmosphere
+ Cherry Blossom Tree was perceived as pretty
+ Background sound was calming.

- Customization of guided meditation setting (length, type or voice) would enhance user experience more.
- Breathing Sphere would be nice to touch

Elevator:

+ Navigation using elevator buttons was natural and intuitive.
+ No sickness using elevator.

- Elevator sound stops abruptly upon scene change.

Activation Scene:

+ Sword picking mechanics were smooth and easy to understand
+ User found the game enjoyable and felt confident while playing
+ Feedback sound upon incorrect sword and cube match was helpful for the user to understand the mechanics.

- Background music was slightly too loud

SUS scores

We receive the following SUS scores:

Testperson 1:

Result

SUS Score: 82.5

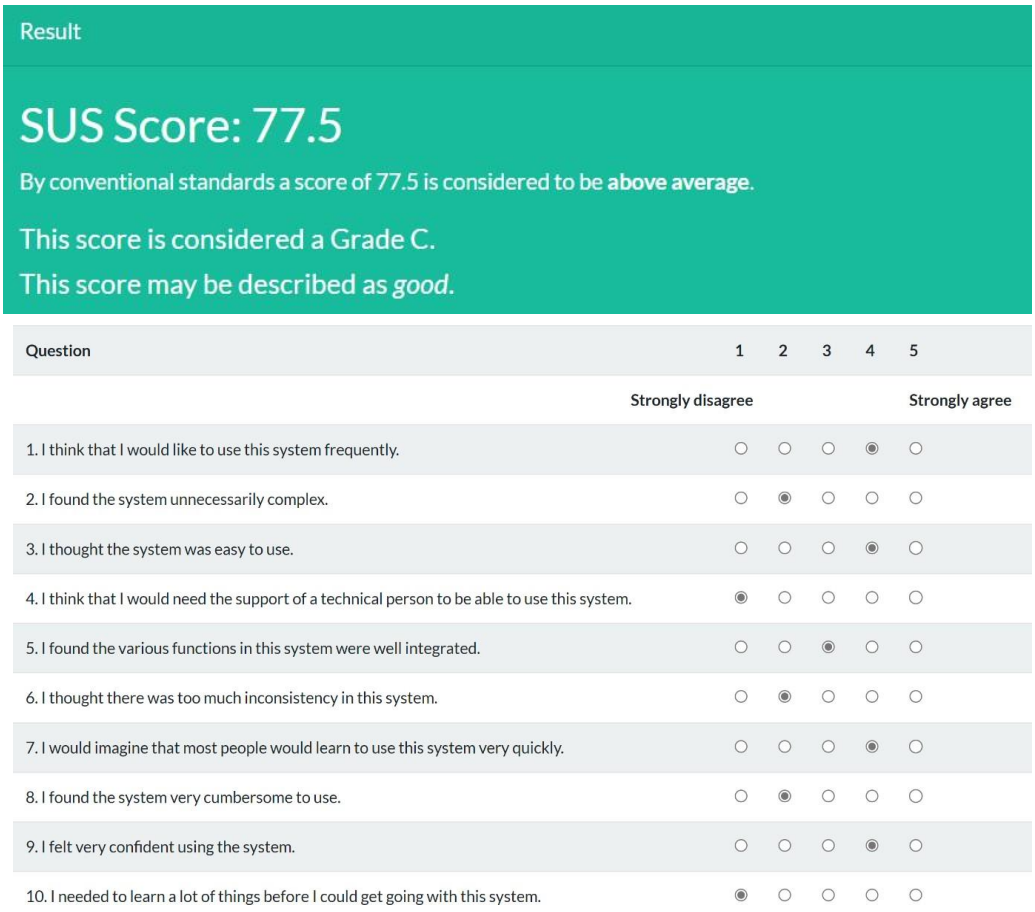
By conventional standards a score of 82.5 is considered to be **above average**.

This score is considered a Grade B.

This score may be described as *good*.

Question	1	2	3	4	5
	Strongly disagree				**Strongly agree**
1. I think that I would like to use this system frequently.	○	○	○	◉	○
2. I found the system unnecessarily complex.	◉	○	○	○	○
3. I thought the system was easy to use.	○	○	○	◉	○
4. I think that I would need the support of a technical person to be able to use this system.	◉	○	○	○	○
5. I found the various functions in this system were well integrated.	○	○	◉	○	○
6. I thought there was too much inconsistency in this system.	○	◉	○	○	○
7. I would imagine that most people would learn to use this system very quickly.	○	○	○	◉	○
8. I found the system very cumbersome to use.	◉	○	○	○	○
9. I felt very confident using the system.	○	○	○	◉	○
10. I needed to learn a lot of things before I could get going with this system.	◉	○	○	○	○

Testperson 2:



Result

SUS Score: 77.5

By conventional standards a score of 77.5 is considered to be **above average**.

This score is considered a Grade C.

This score may be described as *good*.

Question	1	2	3	4	5
	Strongly disagree				Strongly agree
1. I think that I would like to use this system frequently.	○	○	○	◉	○
2. I found the system unnecessarily complex.	○	◉	○	○	○
3. I thought the system was easy to use.	○	○	○	◉	○
4. I think that I would need the support of a technical person to be able to use this system.	◉	○	○	○	○
5. I found the various functions in this system were well integrated.	○	○	◉	○	○
6. I thought there was too much inconsistency in this system.	○	◉	○	○	○
7. I would imagine that most people would learn to use this system very quickly.	○	○	○	◉	○
8. I found the system very cumbersome to use.	○	◉	○	○	○
9. I felt very confident using the system.	○	○	○	◉	○
10. I needed to learn a lot of things before I could get going with this system.	◉	○	○	○	○

Conclusion

Although we were able to conduct only two usability tests, the results provided valuable insights into the strengths and weaknesses of our application. One key takeaway was that the consistent use of the same button-based user interface design simplified interactions in VR, making the application more intuitive and user-friendly. Each scene was positively received, but there is room for improvement—particularly in enhancing customization options in the relaxation scene to better meet individual user needs. Because the Concentration Scene was not tested, we cannot make definitive statements about its usability or its effectiveness in improving concentration. Future testing of this scene would follow a similar methodology, incorporating the think-aloud protocol and SUS questionnaires. To further evaluate the effectiveness of our features and interactions, we could also utilize the User Engagement Scale (Short Form). This tool would provide valuable insights into key aspects of user engagement, such as whether users maintained attention in the Concentration Scene or felt a sense of reward after the Relaxation Scene, and whether they felt fully absorbed in the experience.

Sources

Frewen, P., Mistry, D., Zhu, J., Kielt, T., Wekerle, C., Lanius, R. A., & Jetly, R. (2020). Proof of Concept of an Eclectic, Integrative Therapeutic Approach to Mental Health and Well-Being Through Virtual Reality Technology. *Frontiers in Psychology*, *11*, 535138. https://doi.org/10.3389/fpsyg.2020.00858

Heeter, C. (1992). Being there: the subjective experience of presence. *PRESENCE Virtual and Augmented Reality*, *1*(2), 262–271. https://doi.org/10.1162/pres.1992.1.2.262

Baur, R. (2016). Adult Attention-Deficit/Hyperactivity Disorder (ADHD), Emotion Processing, and Emotion Regulation in Virtual Reality. *Aufmerksamkeitsdefizit-/Hyperaktivitätsstörung (ADHS) Im Erwachsenenalter, Emotionsverarbeitung Und Emotionsregulation in Virtueller Realität.* https://opus.bibliothek.uni-wuerzburg.de/files/14206/Baur_Ramona_emotions_adult_ADHD.pdf

Papers

https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2020.00858/full

https://www.researchgate.net/publication/200772979_Being_There_The_Subjective_Experience_of_Presence

https://opus.bibliothek.uni-wuerzburg.de/opus4-wuerzburg/frontdoor/deliver/index/docId/14206/file/Baur_Ramona_emotions_adult_ADHD.pdf

Sounds

The base sound files were taken from the following sources and edited with audacity.

sound name	**source**
Stone Door (Sword Box)	https://freesound.org/people/ertfelda/sounds/243699/
Activation Game Sound	https://freesound.org/people/kevp888/sounds/511431/
Elevator Sound	https://freesound.org/people/crazymonke9/sounds/423827/
Fireplace Sound for torches	https://freesound.org/people/Vital_Sounds/sounds/713522/
Flint Strike (hit with wrong sword)	https://freesound.org/people/Za-Games/sounds/539973/
Destroyed Rocks (hit with correct sword Old sound)	https://freesound.org/people/jjchubby/sounds/754182/
CollectingCoins (hit with correct sword)	https://freesound.org/people/NXRT/sounds/693840/
Concentration scene sound	https://freesound.org/people/Headphaze/sounds/235527/
Fail sound	https://freesound.org/people/Universfield/sounds/758828/
Meditation 10 min	https://www.youtube.com/watch?v=FjqE9a8aIAM
Meditation 15 min	Autogenes Training | 15 Min. Körperreise // Entspannung & Stressabbau
432Hz Calming Sound	432Hzalpha Wellen Heilen Den Ganzen Körper Und Geist, Emotionale, Physische Und Spirituelle Heilung
Breathing Exercise Explanation	First 10 seconds from https://www.youtube.com/watch?v=1Dv-ldGLnIY

Assets

Asset Name	Source
Fire Torch	https://assetstore.unity.com/packages/3d/props/interior/old-torch-203664
Stonewall Material	https://assetstore.unity.com/packages/2d/textures-materials/stone-wall-photo-based-pbr-160540
Gargoyle	https://assetstore.unity.com/packages/3d/props/feline-gargoyle-27106
Concrete Material	https://assetstore.unity.com/packages/2d/textures-materials/concrete-plaster-textures-4k-179120
Green leafed Tree	https://assetstore.unity.com/packages/3d/vegetation/trees/lemon-trees-200372
Cherry Tree and Grass	https://assetstore.unity.com/packages/3d/environments/lowpoly-environment-nature-free-medieval-fantasy-series-187052

Project Team

Clara Tran
Philippe Fasel

This project was developed for the Extended Reality Course at the university of applied sciences northwestern Switzerland.