It's Me: VR-based Journaling for Improved Cognitive Self-Regulation

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Figure 1: The user interface for VR journaling where the user can review and sort their journal by (1) date and (2) emotion. (3) a relaxing virtual environment is provided, where the user can (4) re-experience their previous story and interact with it.

ABSTRACT

Journaling is a well-known evidence-based strategy for practicing better self-regulation and self-awareness in daily life. It is also an effective way for reducing the effects of negative emotions like anxiety and depression. We explore the combination of virtual reality (VR) and a body-tracking mirror as a cognitive activity in the form of VR journaling. VR-based journaling aims to build cognitive reappraisal, self-reflection, and autonomic emotion regulation in a sustainable way. The user performs in front of the mirror, using body-tracking to help them keep a daily journal. Considering that looking into the mirror is already a daily habit for most people, it does not require the users to form a new habit when trying to do journaling. Furthermore, it activates creativity by encouraging the user to use their body language as a story-telling tool.

CCS CONCEPTS

• **Human-centered computing** → **Virtual reality**.

KEYWORDS

Virtual Reality, Journaling, Emotion Regulation, Avatar, Empathy, Mood, Reflection

1 INTRODUCTION

The conventional way of journaling is writing, which accesses the brain's left hemisphere. While the left brain is occupied, the right brain can use more brain power to understand ourselves and the world around us better [Turgeon 1993]. When people tell their story to themselves, it becomes an activity of self-reflection and cognitive reappraisal. Games and physical activities are also proven to be able to access the left hemisphere of the brain and helps build better understanding ability [Malherbe et al. 2018]. The idea of VR journaling is to motivate the user to do their journal in a fun and creative way that involves body movements. It links a body-tracking mirror and virtual world together by letting the user perform in front of the mirror, using body-tracking to help them keep a daily journal. They can save the motion data, and then transform it into an avatar in the virtual world. Each day of the journal then becomes an individual avatar with saved motion data.

Visual methodologies such as VR can support users to engage with their emotions effectively [Montana et al. 2020]. There is much research on how to make people happy in the VR world but little on how to give users autonomous and personalized mental well-being support. Additionally, there is little research on self-reflecting/self-tracking emotion using body movement at home. Nevertheless, the existing research lacks in letting people express their emotions, whether negative or positive, and most importantly, view it back after some time to get a sense of self-reflection and self-tracking. Previous work has proven that visualizing emotions can be beneficial for the therapeutic and the fact that self-reflection on emotions at home is needed [Wagener et al. 2022].

The contributions of this work are twofold: 1) We propose VR Journaling, A VR-based journal where users can record movements and then review past selves in the virtual environment provides visualized emotions, helping to build self-awareness. Furthermore, 2) we discuss the design considerations and proposed experimental procedure to ensure the virtual environment suggests a safe, relaxing condition to support better self-regulation.

2 DESIGN AND IMPLEMENTATION

The design of the VR Journaling application involves two factors: a body tracking mirror and the virtual world. In most cases, the avatars we meet in the virtual world are other users that walk around, talking or doing movements. Nevertheless, what if the "others" are the users themselves? We built environment using the Unity[1] game engine, experienced through the Meta Quest 2[2]. During the journaling process, the user faces a physical mirror with the Kinect camera[3] mounted on it to record motion data. Each day the motion data of the user performing in front of the mirror will be stored individually. When the user feels like they need to review their journal, they can put on the VR headset and view themselves in the virtual environment, which is designed to boost a calm mood and provide a safe emotional feeling regulation. For example, the user went on a romantic dancing date with their significant other and returned home wanting to record this moment. The user can then make the dance moves in front of the mirror or any other form of performance. The mirror will save the exact data to the user's avatar in the virtual world. After a period of time, the user can enter their VR journaling world to view the happy moments, seeing themselves dancing in front of their eyes.

Writing is describing a past event using words, but movements and gestures type of story-telling not only do good on the physical part, it also stimulates creativity in empathy on another level. In the virtual world, the user can choose to only interact with one past-self at a time or have multiple past-selves together with them.
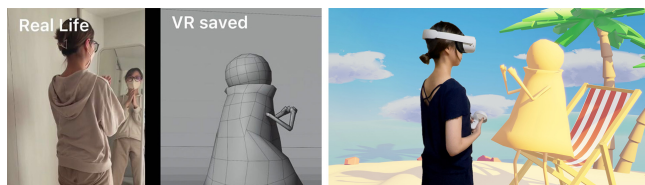

Figure 2: The user perform in front of the body-tracking mirror and the motion data is sent to the virtual avatar. Then view back what was recorded in the virtual environment.
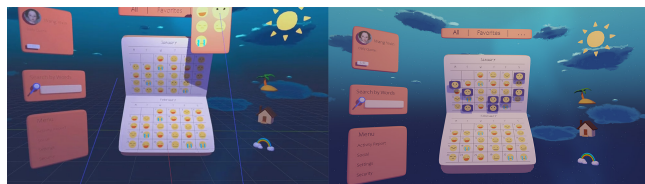

Figure 3: "Sort by emotion" feature in VR application.

2.1 Visualizing Emotion Avatar

The user can switch color of the avatar to reflect the emotion on that specific day they took the journal. It serves the purpose of providing the user with a visual representation of their emotion each day when they go through different phases of their life.

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[1]https://unity.com/
[2]https://store.facebook.com/quest/products/quest-2/
[3]https://azure.microsoft.com/en-us/services/kinect-dk/

2.2 Virtual Environment

When users try to interact with their past selves in the virtual world, they have multiple environmental options: the beach, nature, and a warm bedroom, which are the three environments that have been proven to have a good impact on regulating emotions.[Bratman et al. 2012] Each environment comes with simulations like waters, fires, and calming ambiance sound to boost a calm mood and provide a safe emotional regulation feeling.

3 PLANNED USER STUDY

For our planned user study, we will recruit 20 participants, equally female and male, and separate them into two groups. One group uses the traditional way of journaling by writing into a provided notebook, whereas the other group uses VR journaling. We will keep the variables constant in: The length of the user study, time of the day the participant does their journaling, and amount of time taken. Before the participants start their first day of journaling, we will use a modified version of the Emotional Quotient Assessment to test their level of self-awareness and self-regulation [Goleman 2011]. Then the user study would go for two weeks while we perform experience sampling every three days, asking how they feel about the journaling activities and sense any changes in the process. On the last day of the user study, the participant will be asked to complete the modified version of the Emotional Quotient Assessment again. After collecting the result from the two groups, we will analyze the difference between the first and last assessments.

4 CONCLUSION AND FUTURE WORKS

VR journaling is a system that allows users to take their journals using body performance to achieve the daily story-telling activity and allowing the user to re-experience the past self with a custom avatar and environment. In the future, we will expand the prototype to share stories with others, and perform a user study to evaluate its effect on cognition compared to conventional journaling.

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