

Affective Diary: A Longitudinal Study of a Virtual Reality Diary System for Emotion Expression and Reflection

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Abstract

While the demand for accessible mental well-being support is at an all-time high, a critical gap exists in technologies designed for the daily, personal practice of emotion expression and reflection. In this paper, we investigate how Virtual Reality (VR) can support daily emotional expression and reflection by aligning psychological constructs with interaction design. We first interviewed psychology professionals to identify design considerations for system intervention. Informed by these insights, we designed Affective Diary, a scene-based VR diary system allowing users to externalize feelings through scene-making and reflective revisiting. A four-week longitudinal study with nonclinical participants showed high acceptability and sustained engagement. Participants reported that the VR system supported emotion expression and reflection, perceived peer support, and shared understanding. We conclude with design implications for affective VR systems and report longitudinal insights on how social support can scaffold emotional expression and reflection.

Keywords

Virtual Reality, Mental Well-being, Emotion Expression, Emotion Regulation, Emotion Reflection

1. Introduction

Emotional expression and regulation are increasingly recognized as everyday skills that shape well-being [1, 2]. Digital mental health tools have appeared, especially mobile apps aimed at emotion regulation and well-being, but their designs often emphasize brief check-ins and limited re-engagement with prior experiences, leaving open questions about how technology can better support low-threshold expression and longer-term reflection in daily life. Virtual reality (VR) offers a distinct interaction space for affective technologies as it can externalize internal states into manipulable, spatial, and embodied representations [3, 4]. Prior work has examined VR and emotion across many domains, but much of this literature is driven by short-term empirical studies or symptom-focused interventions rather than sustained, everyday reflective practice [5, 6, 7]. Clinically, cognitive-behavioral therapy includes practices of imagery rescripting (ImRs), a technique where a person revisits a distressing image or memory and actively changes it to update its emotional meaning [8, 9]. While pilot clinical studies have examined the use of VR ImRs, the current evidence remains preliminary and largely focuses on therapist-led feasibility [10]. At the same time, there is little HCI research that translates imagery-based mechanisms into daily immersive reflection tools, highlighting an opportunity to apply ImRs beyond clinical delivery. Building on this gap, we interviewed counseling professionals to ground design constraints for psychologically safe, technology-mediated practices for emotion expression and reflection. We used existing prototypes inspired by clinical practices to elicit professional feedback. Counseling professionals emphasized that even without explicit peer-support features, social support is fundamental and should be delivered through bounded interactions (e.g., validation, gentle perspective,

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encouragement) rather than open-ended socializing (e.g., public sharing). Guided by this framing, we develop and evaluate a VR diary system that allows users to express emotions by bounded content creation in virtual scenes. This system serves as a research artifact to understand the long-term effects of such a tool on users' emotional expression and reflection. Specifically, our guiding research questions are:

- **RQ1** What are the design considerations to effectively support emotional expression and reflection in a VR diary system?
- **RQ2** In non-clinical settings, how do users engage with the VR diary over a four-week period, and what are the perceived effects on their emotional expression and reflection?

To examine how our system supports the emotion expression and reflection process, we conducted a 4-week longitudinal study with 12 participants. Observations and individual interviews revealed diverse patterns of perceived social support, demonstrating the efficiency of the system in emotion articulation. These findings provide empirical validation of our design framework. In summary, this paper offers two primary contributions:

1. For developers and HCI researchers, we proposed and validated a design framework that can lower the barrier for emotional expression and support long-term reflection, offering design implications for expression, anonymity, and reflection.
2. For end-users and communities, we demonstrated a system can normalize emotional articulation, help to reduce stigma, and provide safe avenues for expressing and exploring emotions.

2. Related Works

2.1. Active Imagery Rescripting

Imagery rescripting (ImRs) has long been part of cognitive behaviour therapy (CBT) used for the treatment of patients with distressing and intrusive imagery [8]. In clinical practice, ImRs requires the client to re-enter a distressing memory or image under safety agreements, then rescript it, adding a resourceful self or supportive figure and new actions to update its emotional meaning, and finally consolidates the new meaning into everyday beliefs and coping intentions. Among various versions, active IR (AIR) is a rescripting method where the patient is the active user who revisits the scene they described or created. It has shown particularly positive effects for childhood trauma, and more recent memories such as nightmares [11], providing significant relief from emotional distress [12]. So far, AIR is mainly employed in vivo, face-to-face clinical settings [10]. Extending its practice into technologically mediated contexts could unlock advantages such as scalability, accessibility, and novel forms of engagement. A recent review work [10] has pointed to the potential of VR to deliver IR-based interventions. Yet to date, no studies have deployed or systematically evaluated this technique in immersive environments.

2.2. Digital Approaches to Emotional Expression and Reflection

Studies have long explored how digital technologies can support emotional expression, ranging from writing diaries [13] and expressive art tools [14] to interactive mobile applications [15]. These approaches have been proven efficient in helping externalize users' intentions and regulate them. In HCI, researchers have designed systems that transform personal experiences into visual or narrative formats to encourage reflection and coping. For example, an early work by Ståhl et al. [16] presented a system that allowed users to externalize daily moods through bodily data and symbolic icons; Gallacher et al. [17] designed tangible interactions for users to articulate stress and relief; and Jiang et al. [1] developed a smart t-shirt to help healthcare personnel to regulate their emotions at work, where the stress and mental exhaustion can be high. More recent work has extended this line of research into immersive environments, showing how VR's support of presence and embodiment can lower the threshold

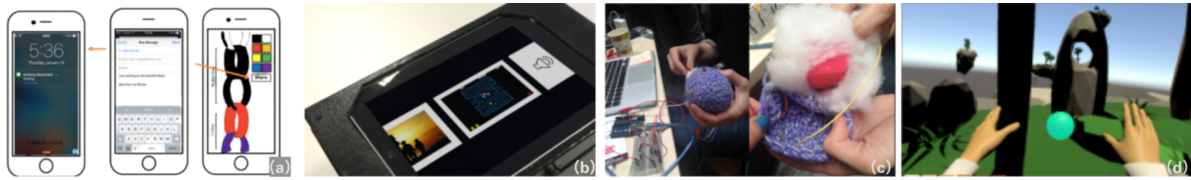


Figure 1: Supportive prototypes used in the formative study. (a) Paperchain [22]: a mobile-based tool inspired by dialectical behavior therapy, allowing users to tag events, color digital paper links, and track moods over time; (b) Digital Distraction Box [22]: a physical device designed to reduce harm, locking away self-harm tools until users interact with a screen showing positive images or games; (c) Squeeze [22]: a tangible toolkit combined with an online repository, based on mindfulness and breathing techniques, providing digital feedback through a stress ball; (d) VR Intervention (Three Games) [23]: immersive experiences focusing on body control, mindful breathing, and repetitive tasks to redirect attention.

for emotional articulation and create new spaces for self-reflection [5]. For example, Slater et al. [18] demonstrate that embodied self-dialogue in VR, in which users alternate perspectives between their own and a mirrored avatar, facilitates emotional expression and introspection. Also, Shigyo et al. [19] designed VR-mediated exercise for promoting cognitive defusion to address negative thoughts grounded in Acceptance and Commitment Therapy. While significant advances have been made, existing system designs typically focus on short-term, individual emotional expression through specific interaction features. Studies seldom address the practical challenges of long-term deployment in everyday contexts, such as sustained group use (e.g., students engaging with VR exergames over a 6-week period [20] and healthcare workers in their natural work environments for a period of 6 days [1]). Furthermore, prior research has largely overlooked the potential of VR to cultivate empathy and social support, which are known protective factors for emotional well-being in online environments [21, 10, 4]. This research gap motivates our work, aiming to establish theory-grounded design goals that integrate expressive interaction with mechanisms for mutual support and longer-term emotional well-being.

3. Formative Study

We conducted a formative study with domain experts to (1) identify key considerations for technology-mediated emotion expression and reflection and (2) clarify what conditions make such practices sustainable over time. Our goal was not to design a clinical intervention but to extract designable mechanisms and constraints that can inform an ImRs-based diary system for emotional expression and reflection.

3.1. Participants

We consulted three counselors as expert informants. Two participants worked at a university counseling center, and one was a community-based counselor. They primarily conducted in-person individual counseling, aged from 37 to 54 ($M = 44.00$, $SD = 8.89$). Inclusion criteria were (1) formal training in counseling or psychology, (2) direct experience supporting clients with everyday emotion regulation challenges (e.g., distress management, anxiety, interpersonal stressors), and (3) willingness to discuss boundaries and safety considerations for technology-mediated emotional expression and feedback.

3.2. Materials and Procedure

To prompt concrete discussion, we sourced five prototypes from prior work that demonstrate visual or embodied emotional expression and reflective practices (see Figure 1). The set covered different approaches to affective support, including VR-based interventions, mobile journaling, and peer-support platforms. They were used as discussion anchors rather than evaluation targets. This study was approved by the University Ethics Committee of Xi'an Jiaotong-Liverpool University.

Each interview was conducted individually in a private setting (20–35 minutes), audio-recorded, and transcribed verbatim. The first part required counselors to describe common pathways through which

Table 1

Mapping from evidence sources to design, showing how the imagery rescripting theory and formative insights shaped our design considerations and design practices in Affective Diary.

Evidence source	Design considerations	Design practices
Imagery rescripting	Support low-threshold imagery-based expression	Create diary scenes
	Revisit salient moments in scenes	Revisit scenes
	Scaffold rescripting and meaning-making	Comment on past-created scenes
	Support consolidation across time	Longitudinal engagement
Formative study findings	External scaffolding for sustained engagement	Three-person groups
	Psychologically safe interpersonal interaction	Anonymous participation
	Regulation-oriented support	Comments reviewed and moderated

people seek help for emotional difficulties, typical barriers to emotional expression in daily life, and constraints relevant to tool adoption. The second part is a prototype walkthrough, where counselors reviewed each prototype and reflected on (a) what mechanisms it supports, (b) what is missing in real use, and (c) what boundaries are necessary if any interpersonal features were introduced.

3.3. Analysis and Findings

We conducted a hybrid deductive–inductive thematic analysis. Deductively, we used sensitizing concepts aligned with the four components extracted from imagery rescripting to guide initial coding. Inductively, we open-coded segments describing needs, constraints, and design opportunities. Codes were iteratively merged into higher-level themes through repeated comparisons across participants. To improve trustworthiness, we maintained an audit trail that linked representative excerpts to theme definitions and to specific design decisions and discussed emerging themes within the research team to refine interpretations. The study showed three main findings:

F1. Sustained engagement requires external scaffolding, especially during distress peaks. Counselors noted that reflective tools are highly likely to fail when distress is high. Therefore, long-term engagement depends less on individual willpower and more on external conditions that keep people connected to support.

F2. Support must be bounded and psychologically safe. Counselors stressed that any interpersonal element must not increase vulnerability. They highlighted boundaries, such as anonymity, controlled visibility, and feedback constraints, to reduce fear of judgment and make disclosure feasible.

F3. Support should be lightweight and regulation-oriented, but not socializing. Rather than open-ended social interaction, counselors described helpful support as concrete and low-burden: validation (e.g., “you’re not alone”), gentle perspective (e.g., “another way to interpret this”), and encouragement (e.g., “you can try next time”). This framing suggests that comments should function as regulation resources instead of casual conversation.

4. Methodology

4.1. Design Considerations

To bridge theory and design, we develop a conceptual design model that synthesizes the imagery rescripting theory and our formative study findings. Table 1 summarizes the design framework, outlining the sources of design considerations mapped with the design practices. It clarifies how the system’s interaction elements implement regulation-relevant processes and provides traceability from theory and formative evidence to concrete design decisions.

Specifically, previous work [8, 9, 24] showed that ImRs motivates a repeatable regulation loop: users first externalize an affective experience into concrete imagery, then revisit emotionally salient moments, rescript the imagery toward safer meanings and coping directions, and finally consolidate change through repeated reflection and integration over time.

In Affective Diary, we operationalize this loop by translating the design considerations into design features: (1) supporting low-threshold imagery-based expression through scene diary authoring, (2) enabling revisits of prior entries, (3) scaffolding rescripting by allowing scene editing and commenting, and (4) supporting longitudinal organization that supports integration across episodes.

In addition to the design considerations informed by the imagery rescripting theory, we draw insights from our formative study with counselors. By translating the findings into the system and study design, (1) we formed three-person groups to create external scaffolding and sustain user engagement; (2) we implemented anonymized participation to ensure that the interpersonal interactions are psychologically safe; and (3) we reviewed and moderated the comments created by participants to check if they align with the regulation-oriented support.

4.2. System Design

Following the design guidelines obtained above, we developed Affective Diary, a scene-based VR platform that enables interactive visualization of emotions to support individuals' emotional expression and reflection. The system was developed using the Meta Core SDK,¹ and models were sourced from the Polyperfect resource kit.²

The virtual scene construction is based on the Sandplay Theory [25], which shows that constructing environments with elemental materials (e.g., earth, water, objects) demonstrates symbolic and therapeutic value to externalize and transform inner emotional states. This indicates that these elemental materials form a foundation for symbolic placement and provide a concrete manifestation of one's psychic base. Therefore, we prepared a set of scenes containing various elements for interaction, including skyboxes and models. Specifically, there are four size-based categories of 3D models: (1) People: Human avatars with varied clothing styles; (2) Small objects: approximately half the height of a human, including small animals, flowers, food, and stones; (3) Medium objects: roughly twice human size, such as furniture, trees, stones, and vehicles; (4) Large objects: four to five times human size, including planets and architectural structures. The system allows users to select scenes, adjust the skybox, and select and manipulate objects to construct the virtual scenes (see Figure 2).

5. Evaluating Affective Diary: A Longitudinal Study

5.1. Participants and Apparatus

We conducted a longitudinal study with 12 participants (6 females, 6 males) aged 18 to 25 years old ($M = 21.67$, $SD = 1.92$), mainly students from a local university. Over half of them ($N = 7$) had prior experience with VR devices, among which three had used VR frequently in the past month. Seven reported experience with sandbox-style games. All participants were familiar with online social platforms, though none had experience with VR-based social platforms. Notably, more than half of them ($N = 7$) reported experiencing negative emotions triggered by content encountered on online social platforms, such as posts, discussions, or acquaintances sharing such experiences. Considering the intended usage context, all sessions were conducted in participants' homes, with a one-to-one setup between each participant and the moderator. The experiment equipment included a laptop with an NVIDIA GeForce RTX 4060 graphics card and 16 GB RAM, and a Meta Quest 2 VR head-mounted display (HMD) with controllers. The study was approved by the ethics review board of our university.

¹<https://developers.meta.com/horizon/downloads/package/meta-xr-core-sdk/>

²<https://www.polyperfect.com/>

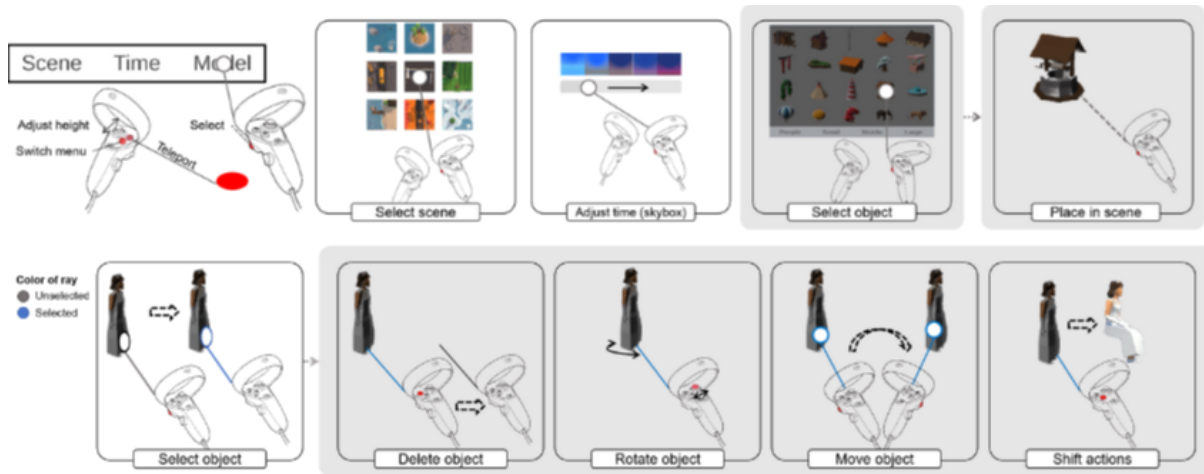


Figure 2: Controller operations in the Affective Diary system. (a) The left controller allows users to switch menus, adjust avatar height, and teleport within the scene (indicated by the red circle). The right controller is used to select and place models in the environment by interacting with the menu (Scene, Time, Model); (b) Select scene: users browse and choose a base environment from preset scenes; (c) Adjust time (skybox): users modify the scene’s skybox and lighting by sliding a time-of-day control; (d) Select object: users open a categorized object menu (people, social, wildlife, large items) and select a model; (e) Place in scene: users position the selected object in the chosen location of the virtual environment; (f) Illustrations of the controller interactions for object selection and manipulation.

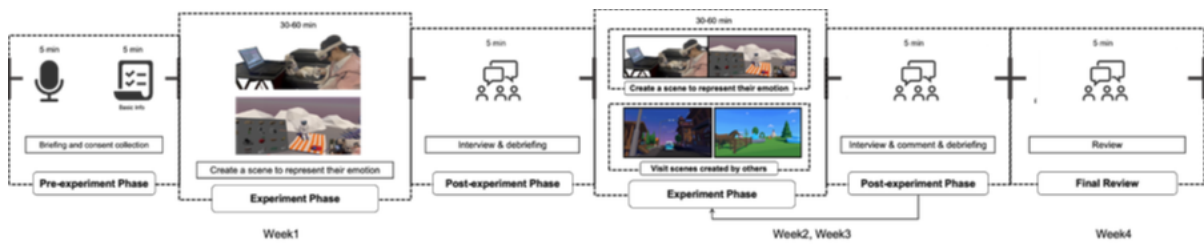


Figure 3: Experimental procedure of the four-week longitudinal user study. Users were asked to create a virtual scene to represent their feelings in the experiment phase, then describe their feelings in the interview phase. In week 2 and week 3, users were invited to view three virtual scenes created by others in the experiment, then give comments in the interview phase. Participants were invited to review their scenes and reflect in week 4.

5.2. Procedure

The study lasted for four weeks. Each week, participants created a virtual scene to express their mood at that time. A semi-structured interview was then conducted to capture participants’ reflections on their scenes, asking them to (1) describe the scene, and (2) describe their feelings. From the second week onward, a group therapy–inspired approach was adopted. Within each group of three, each participant worked independently to create a new scene and visit two scenes created by the other two in the previous week. In follow-up interviews, they commented on their own scenes and the scenes of others. In the final week, participants took part in a review session, in which they revisited their previously created scenes, reflected on their feelings at those times, and shared their overall impressions of the system. The study procedure is summarized in Figure 3.

6. Results

6.1. Overview of Scenes Created by Participants

An overview of the scenes is provided in Figure 4. In terms of the elements used, we observed that negative feelings were translated into objects such as tangled wires, cracked stones, fences, and heavy

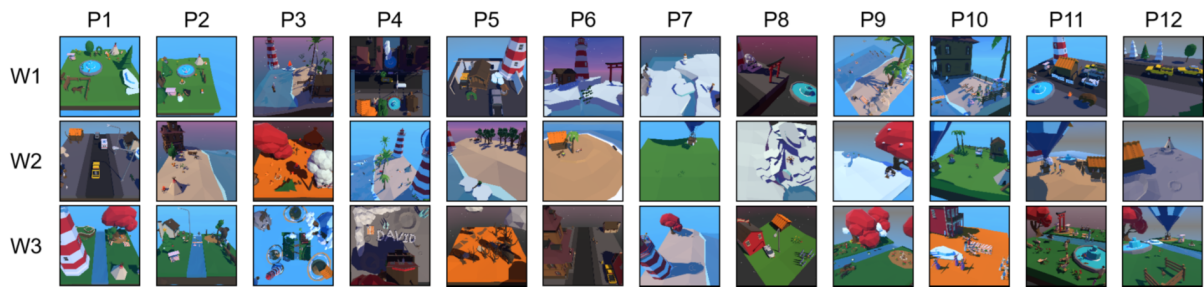


Figure 4: Screenshots showing the virtual scenes created by participants. Each participant used the Affective Diary to create a virtual scene once a week.

blocks, often emphasizing angular or sharp forms to signal pain or hurt (P2, P6, P9). Some participants relied on dark or muted colors to symbolize sadness or heaviness, while brighter tones were used sparingly to indicate hope or relief (P1, P8). A few participants repeatedly used specific motifs, such as flames, houses, or trees, to convey recurring emotional states. For example, flames could appear as small campfires when moods were lighter, but as uncontrollable blazes when anxiety intensified (P3). Houses and fences were associated with boundaries or protection (P10), while trees represented stability or fear of exposure to the outside (P10). These symbolic choices reveal how participants externalized affective states into visual forms, allowing subtle or hidden emotions to surface and be revisited over time.

6.2. Scene Creation Enabled Emotional Expression and Heightened Awareness

The simplicity of scene construction enabled participants to express themselves without additional effort, even when fatigued or in a negative mood. P2 felt that even though he was stressed in reality, he was *“still in a pretty pleasant mood while he was building it”*. Also, P7 said *“Even after a full day of work, I don’t feel resistant or reluctant to doing it.”* P8 was still able to complete a scene with full expression after 24 hours of continuous work the day before.

Not all participants had a clear theme in mind, but most of them were able to construct expressive scenes by browsing through existing models. P9 stated, *“After I play the first time, I immediately have a feeling of anticipation for the second time, which is when you are going to come to me to do the second time, and I will feel like you’re kind of having fun with this thing. When are you going to come to me to do the next one?”* P3 did not express an evaluation of ease of use in the interview, but she thought the prototype was *“like playing a game,”* and she would ask to participate in the weekly experiments before they were conducted. P11 did not have a clear theme when building the scene and commented that *“It was more of an exploratory mindset and not very purposeful to create a certain type of scene.”*

Participants highlighted that scene building lowered the threshold for emotional expression compared with traditional methods. P4 contrasted scene building with writing, arguing that writing is a more in-depth form of expression but requires the creator to have a good understanding of his or her own mood, whereas ambient editing is a way of helping people who do not know their own emotional state to be able to express their *‘hidden emotions.’* P8 argued that this method could help him sort out his moods: *“It is a good way to relieve and express emotions by building a mental world, similar to the process of tidying up a room, which can reflect subconscious thoughts.”*

Through repeated expression and reviewing, participants gradually developed greater awareness of their emotions. P7 was not sure about what he wanted to express during the first week. However, as he continued expressing himself in the subsequent weeks, he began to gradually develop the ability to be aware of his emotions. In week one, he expressed that he wanted to create a funny scene, but upon reflection, he found that it instead conveyed a sense of anxiety. P12 said that he was *“improvising”* and did not need to have a predetermined theme before he expressed it. P1 stressed that the system was mainly for expression rather than direct regulation: *“I feel like it’s more of an expression; there’s no change in the mood, it’s just an expression... maybe expressing it is just the equivalent of a cathartic feeling. I feel like it might still help.”* In other words, she found value in the act of recording itself, even

without immediate mood change.

Importantly, participants perceived scene construction as closer to social or creative activities than to therapy. P4 found it comparable to writing. P5, P9, and P11 referred to it as a form of art creation, while P6 found it similar to browsing social media, commenting it “as if it was this scene that I swiped on.” Thus, participants framed Expression as an experience more akin to gaming or art-making than psychotherapy, an implementation that reduced psychological pressure and potentially mitigated stigma.

6.3. Tendency to Empathize with the Positive and Detach from the Negative

Several participants described how exploring others’ creations could become a personal gain. P4 noted, “Seeing other people’s scenes also opens up my own thinking about making scenes, and also if I happen to be able to feel the other person’s mood through their scene, that would be interesting too.” P6 connected the type of exploration to social media practices: “If I swipe a scene expressing a negative mood, I might spend a few seconds trying to figure it out, but if I can’t, I just move on. Positive or dreamy scenes, though, catch my attention, and I might even give the author a bit of recognition.”

Participants reflected on how exploring others’ scenes affected their own emotions and interpretations. Overall, they noted that the prototype allowed them to perceive others’ moods without being overwhelmed by negative affect. As P2 explained, “I don’t feel good when I see a scene with people in a bad mood because after all, it’s in that environment, and who would feel good when they see that kind of gray, black, and foggy environment? ... The same reason why the sun does not come out for a week in a row will not be in a good mood.” In contrast, P3 showed a sense of detachment, commenting that “It’s someone else’s stuff” when viewing others’ scenes, indicating that she was not directly affected by others’ moods.

Participants were also concerned with the boundaries of negative expression. P8 highlighted discomfort when scenes conveyed harmful intent: “If someone’s scene is trying to express a kind of malice towards someone else, I think it might be uncomfortable...if you’re expressing malice and hatred towards others through this scene, for myself, I would feel uncomfortable with that. Because his intention is not to express himself, but to hurt others.”

While several participants described inspiration or resonance when exploring others’ scenes, P9 highlighted the limits of such empathy: “Maybe a little, but not much. My mood still depends on myself. I’m not going to feel genuinely happy just because someone else makes a happy scene.” This suggests that, for some, the capacity to gain empathy through others’ creations remained constrained by their own affective state.

6.4. Reflective Meaning-Making over Time

Participants reflected on their scene retrospectively in the end, often identifying emotional changes or patterns that were not apparent at the time of creation. Overall, half of the participants reported being able to identify emotional changes in retrospect and to trace their possible causes. P1 explained that reviewing her scenes helped her realize “my mood swings were very volatile,” which led her to acknowledge a lack of emotional stability and the need for developing greater emotional resilience. Similarly, P4 initially thought she was simply constructing an entertaining scene, such as building an ending to her favorite cartoon in Week 3, but later recognized it as an expression of “confusion and uneasiness about the future” during a difficult period. P6 contrasted her original intentions with later interpretations: “Maybe I wanted to express it at the time, but I couldn’t... Every period has its different moods, right?”

Participants also discovered recurring expressive elements across their scenes. P1 reflected, “I’m all about color, I just really like to use color to express my moods because I think color is just a visual representation of people’s personalities moods and those kinds of things.” P3 consistently incorporated flames, but their meaning shifted: flames were in a controlled state when expressing positive moods (e.g., a campfire party in Week 3), but showed uncontrollable states when feeling anxious (e.g., flames on water in Week 1 and covering the scene in Week 2). P10 frequently used houses, fences, and trees,

later interpreting these as symbols of self and boundaries: “the house is my own space, the fences are boundaries. Even though I’m playing with them, the fence represents that everyone is just playmates ... and then I put the tree every time because I’m afraid of the sun.” These recurring elements illustrate how participants revisited and reinterpreted their expressive motifs over time, deepening their personal narratives through each scene.

6.5. Gaining Support and Mutual Understanding through Social Interaction

Overall, 4 out of 12 participants explicitly described experiencing others’ interpretations as a form of support. P11 emphasized that “although I felt I didn’t fully show it, what P7 said was right”, highlighting how being accurately understood created a sense of validation. P3 remarked that “seeing others’ scenes gives me inspiration, and when their mood is good, I also feel a bit better”, suggesting that positive interpretations from peers could directly uplift their own mood. P4 also reported that scene construction allowed hidden emotions to be surfaced and recognized by others: “compared to straightforward words, constructing scenes allowed me to better express hidden emotions.” Similarly, P10 drew parallels between their own and another’s work, “he still wants to be positive... I think he, like me, is also someone who lacks a sense of security”, indicating a sense of mutual understanding.

7. Discussion and Future Work

This preliminary 4-week study provides insights for the two research questions we asked. For the design considerations for emotional expression and reflection (RQ1), our findings suggest that VR diaries should prioritize low-threshold, embodied externalization, where users can help to express feelings through spatial metaphors and objects rather than relying on verbal articulation, extending earlier HCI work on affective journaling and interaction designs [16, 17]. To support reflection, entries should be highly revisitable and organized longitudinally, so users can compare moments across time and reinterpret what an episode meant, consistent with evidence that reflective practices benefit from sustained, structured engagement [13, 15]. We further argue that reflection should be made more regulation-oriented by supporting guided rescripting and revisiting of those emotionally salient moments and following emerging VR-ImRs directions [8, 26]. Finally, social features should function as bounded scaffolding (e.g., anonymous triads and lightweight commenting features) that offer validation and a gentle perspective instead of open-ended social exposures, aligning with prior findings on perceived social support in social VR [27].

In response to RQ2 about users’ long-term engagement and the perceived effects, we demonstrate through a four-week long study that participants’ continued use of VR diaries supported their ongoing emotion expression and reflection through various lenses. Participants used scene-making to express emotions that were hard to name, complementing evidence that VR can meaningfully shape emotional experience and reflection [5]. Notably, the most salient reflective value emerged through revisiting. Participants recognized changes and recurring patterns across weeks. This demonstrated the value of embodied self-reflection in working with negative experiences, echoing the findings in prior studies on VR mental health [18, 19]. Finally, the design of such diary systems should be careful with social features. Anonymous triads and lightweight commenting could provide support for some participants, but benefits were not universal, reinforcing the need for constrained, safety-oriented social design rather than fully open community dynamics [27]. A common challenge in digital mental health tools is the sustained engagement [15]. Our study steps to address this challenge and summarizes concrete design considerations with design practices. Future work should further explore strategies to enhance sustained engagement. For example, the system could offer adaptive guided prompts informed by users’ prior entries to better support revisiting and reflection. Another promising direction is to investigate how different social configurations shape user experience and psychological safety. This includes optional shared reflection spaces with trusted peers or therapists, supported by clearly bounded interaction rules. In addition, it would be valuable to examine how different visualization metaphors influence emotional

processing and reflection trajectories over time. Finally, we would also study how VR diary systems can be adapted for diverse populations and contexts to maximize their reflective and therapeutic benefits.

8. Conclusion

This paper presented Affective Diary, a scene-based Virtual Reality (VR) system designed to support daily emotional expression and reflection through the lens of Imagery Rescripting (ImRs) and Sandplay Theory. Through a four-week longitudinal study with non-clinical participants, we validated a design framework that aligns psychological constructs with interaction design. Our findings indicate that embodied scene construction enables users to express hidden or complex emotions without the cognitive load of other practices, such as writing, fostering heightened emotional awareness over time. The study highlights the value of longitudinal revisiting; participants were able to trace emotional patterns and reinterpret past experiences, confirming that sustained engagement is vital for meaningful reflection. In short, Affective Diary provides empirical evidence that VR can normalize the articulation of emotions and reduce stigma associated with mental well-being practices. For HCI researchers and developers, this work underscores the necessity of designing for safety, anonymity, and long-term scaffolding rather than short interactions. Future iterations should explore adaptive prompting to further sustain engagement and investigate clinical adaptations of this framework.

Declaration on Generative AI

During the preparation of this work, the authors used ChatGPT to polish English phrasing and correct grammatical errors. After using this tool, the authors thoroughly reviewed and edited the generated text and assumes full responsibility for the final content, accuracy, and originality of the publication.

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