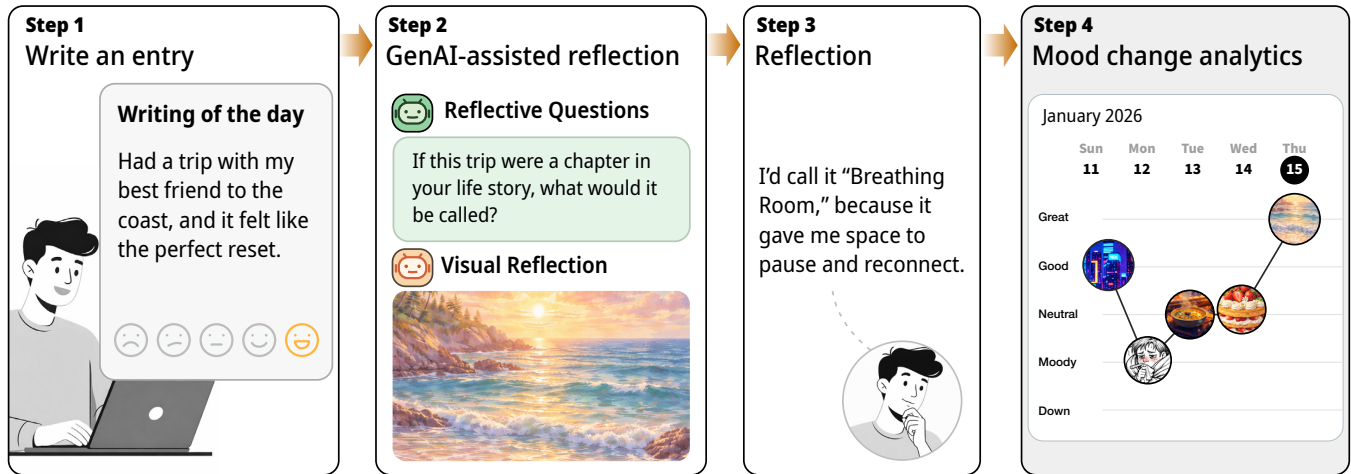


# Supporting Self-Expression and Reflection in Expressive Writing

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**Figure 1: Mindful is a generative AI-enhanced writing tool that supports self-expression and reflection through expressive writing. The figure illustrates the workflow of Mindful in facilitating reflection. (Step 1) Users write an expressive entry about their day and record their mood using emojis. (Step 2) After researchers review the safety of AI-generated content through a separate review system, users receive reflective questions and visual feedback generated from their written entry. (Step 3) Users continue reflecting based on the provided prompts. (Step 4) Users can track changes in their mood over time through a line graph that incorporates generated images to represent the context of each day.**

## Abstract

Expressive writing can support emotional processing and well-being, but reflection does not automatically emerge from unstructured writing. In this work, we present Mindful, a GenAI-enhanced reflective writing tool that augments self-expression through personalized, AI generated reframing questions and visual reflection prompts grounded in users' text. Designed as a Tool for Thought, Mindful scaffolds cognitive reframing and meaning-making while mitigating potential AI-related harms through a human-in-the-loop oversight approach. This work is relevant to the CHI 2026 Workshop on Tools for Thought as it demonstrates an implementation of a generative AI-enhanced system designed to augment, rather than replace, human cognition.

## CCS Concepts

• **Do Not Use This Code** → **Generate the Correct Terms for Your Paper**; *Generate the Correct Terms for Your Paper*; Generate the Correct Terms for Your Paper; Generate the Correct Terms for Your Paper.

## Keywords

Expressive Writing, Generative AI, Reflection Support, Multimodal Reflection Support, Reflective Questions, Visual Reflection, Safe AI-Supported Reflection, Reflection Through Data Visualization

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## 1 Introduction

Expressive writing can help individuals process their thoughts and emotions surrounding lived experiences. While the technique is widely adopted in clinical settings to help individuals process traumatic and stressful events[17], prior research demonstrates that, it is equally effective in managing everyday stress, and improving overall psychological well-being by promoting self-reflection

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[2]. However, expressive writing alone does not guarantee reflection and insights. Without guidance and structure, writers may remain at surface level description of events expressive writing or reinforce rumination or habitual negative interpretations [7]. The reflective benefits of expressive writing depend on mechanisms such as cognitive reframing [10] and reinterpretation that help individuals examine the meaning of their experiences [15]. Despite clear benefits, most modern digital journaling tools are not designed to support these mechanisms and often reduce expressive writing to a neutral text-entry experience. While many tools in the space of digital journals support disclosure [3], they rarely provide mechanisms to improve expression and reflection. Although structured prompts are known to deepen reflection [6], they are rarely personalized and do not respond to writer’s evolving narrative.

In this research, we address this gap by proposing MINDFUL, a tool that supports thought and reflection by integrating cognitive reframing and visual cues grounded in user’s writing. Our tool provides personalized thinking prompts to support *cognitive reframing* - a deliberate process of deepening reflection and interpretations of lived experiences. These dynamically generated prompts, implemented using large language models (LLM’s), are tailored to each written experience, to gently nudge writers towards alternate interpretations and perspectives. For each written entry, the tool also incorporates a *visual grounding* mechanism by generating an image that is an abstract representation of the written experience. This visual grounding through images is designed to enhance expressivity in writing by externalizing abstract emotions into tangible visual forms. These visuals can evoke feelings and prompt users to express thoughts that may be difficult to articulate in words [22].

One risk associated with using AI-generated text and images in reflective tasks such as expressive writing, is the potential for unintentional harm, including inappropriate, misleading, or emotionally triggering content that may be difficult to anticipate or reproduce [11]. To mitigate this risk, we incorporate a human-in-the-loop oversight mechanism in which generated visual cues and cognitive reframing prompts are routed to a trained human supervisor prior to delivery. The supervisor reviews the content for safety, appropriateness, and alignment with reflective goals, and filters potentially harmful outputs. The tool also provides mood tracking and visualization features to support longitudinal reflection.

## 2 Related Work

Foundational research on expressive writing demonstrates that writing about emotionally significant lived experiences can lead to improved psychological as well as physical well-being [5, 17]. Additionally, theories in reflection practices emphasize the role of structured reflection in processing and reinterpretation of personal experiences. Within HCI, reflection has been framed as an interactive and designable process, where scaffolding and structured prompts can provide deeper insights [1]. However, prior research also notes that unstructured and unguided reflection can reinforce rumination and prevent productive re-interpretation [14], suggesting that effective reflection depends on mechanisms such as cognitive reframing. Although expressive writing encourages emotional disclosure, individuals often struggle to translate complex experiences into coherent language. Thoughts and emotions can feel diffused or

overwhelming, making it difficult to articulate them [5], leading to writers defaulting to mere recounting of events

Research in personal health informatics and reflective technologies shows that visualizations and guided interactions can promote self-awareness and longitudinal sensemaking [20]. Yet, many digital journaling tools exist as neutral text entry spaces, and lack reflection support for meaning-making [4]. Recent advances in large language models (LLMs) have enabled AI-supported writing and mental health systems that dynamically respond to user input. Emerging work examines LLMs as tools for reflective dialogue, emotional support, and writing augmentation [8, 13, 20], while also raising concerns about safety, bias, and unintended harm in sensitive contexts [12, 21]. Despite this progress, few systems explicitly operationalize cognitive reframing within expressive writing or integrate multimodal representations to scaffold reflection.

Recent work in HCI has begun exploring generative AI to augment reflection. *MindfulDiary* uses LLMs to support psychiatric journaling and facilitate communication with clinicians [8]. *DiaryMate* investigates LLMs as personal journaling assistants [9]. Tools like *MindScape* integrate passively sensed behavioral data with LLM-generated prompts to enable context-sensitive reflection [13], and *Metamorpheus* encourages self-reflection through the creation of metaphorical images and text depictions based on a dream’s emotional arc [20]. While these systems demonstrate the promise of AI-assisted journaling, most rely primarily on text-based prompting or conversational interaction. In contrast, we introduce a multimodal approach that integrates adaptive cognitive reframing prompts with AI-generated visual cues to support both expressivity and reflection.

## 3 Design Goals

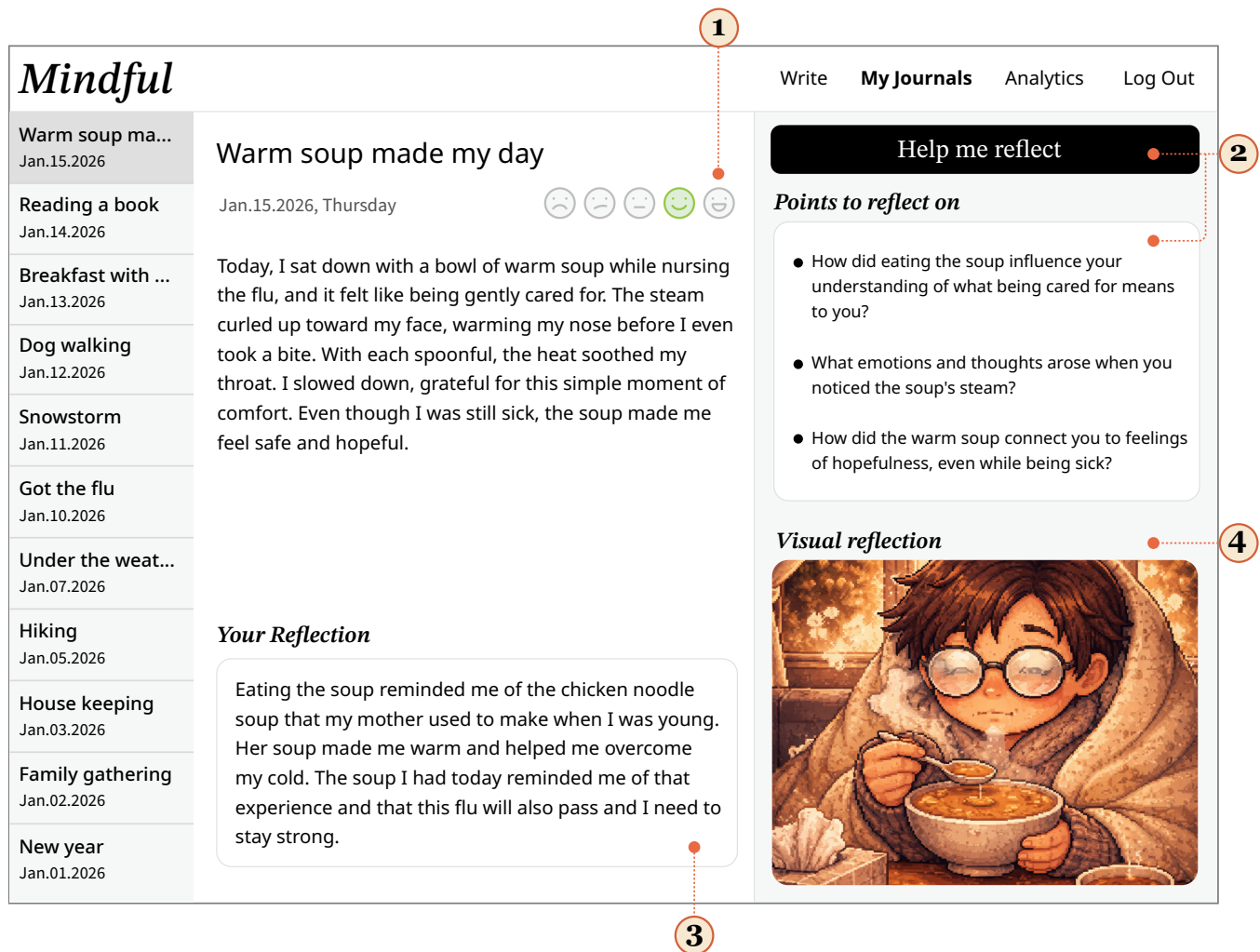
The goal of our system is to support expressive writing from open-ended disclosure into a structured process of reflective sensemaking. We identify four salient design objectives that guide the design of our system, MINDFUL.

### Cognitive Reframing for Constructive Reflection (DG1):

Expressive writing can unintentionally reinforce negative interpretations. Without structured support, writers may dwell on perceived failures or internalized criticism rather than generating meaningful insights. Without structured support, reflection can become repetitive and problem-focused. To address this risk, our first design goal is cognitive reframing, that involves revisiting lived experiences from an alternate, more balanced perspective. To help writers move beyond recounting events, our system embeds cognitive reframing-oriented prompts, directly into the writing process.

### Visual Cues to Support Expressive Depth (DG2):

The second design goal is to support self-expression through visual cues grounded in users’ writing. Text alone can limit how individuals articulate abstract emotions or complex experiences. Visual imagery can evoke affect, surface implicit meanings, and prompt new interpretations that may not emerge through words alone [16, 18, 19]. To operationalize this goal, the system generates images directly from journal entries using generative AI. These images act as expressive anchors, helping users view and write their experiences from a different perspective. To support creative agency, the system offers multiple visual styles—digital art, line art, pixel art, analog



**Figure 2:** (1) Users can rate their mood (2) For the newly written journal entry, users will see an empty text box where they can write their further reflections. When users click the 'Help me reflect' button, AI reflective questions will be generated based on the journal entry in the box under points to reflect on. (3) Users can choose one question they want to further reflect on and write their reflection in the Your Reflection text box. (4) In addition to AI generated reflective questions, users can see the AI generated image as a visual reflection and way to express their feelings and emotions.

film, and neon punk—allowing users to select a visual language that resonates with their personal expression.

**Longitudinal Emotional Sensemaking (DG3):** The third design goal is to help users discern trends in how their thoughts and feelings changes over time and support longitudinal sensemaking. In addition to capturing isolated entries, the system also must help users recognize patterns in how their emotions evolve across days and contexts. By explicitly reporting their daily mood using a simple affect scale represented by face emojis, the system captures data that reflects lived emotional experience rather than algorithmic inference. Beyond basic mood tracking, the system also provides contextualized visualizations where AI-generated images associated with each written entry are embedded within the visualization

timeline. This allows users to connect emotional trends with the experiences that shaped them.

**Risk Mitigation and Responsible AI Oversight (DG4):** The fourth design goal is to mitigate risks associated with generative text and image outputs in reflective contexts. AI-generated prompts or visuals may unintentionally introduce harmful, biased, or emotionally triggering content, particularly in sensitive tasks such as expressive writing. Such risks can undermine user trust and compromise psychological safety. To address this, the system incorporates a human-in-the-loop oversight mechanism. Generated prompts and images are reviewed by trained professionals prior to delivery to ensure safety, and alignment with reflective goals. By embedding moderation and oversight into the interaction pipeline, the system

supports responsible deployment while preserving the benefits of AI-supported reflection.

## 4 System Implementation

Mindful is implemented as a full-stack web system that integrates cognitive reframing, visual expression and reflection, and human-in-the-loop oversight. The system is designed to support both user-facing interfaces and reviewer workflows with a shared infrastructure. workflows.

The system follows a modular client–server architecture. The frontend is implemented using Vue.js and deployed as a stateless web application. Firebase is used as the primary backend platform for authentication, data storage, and real-time synchronization. The backend consists of multiple Flask-based API services that host large language model (LLM) calls for reflective question generation using OpenAI GPT3.5 and image generation using Stable Diffusion. AI-generated artifacts, reflective questions and images, are generated asynchronously and stored separately from the user content. Generated images and reflective text are hidden from users until they are reviewed. Reviewers independently approve or reject images and reflective content based on specific criteria defined by. Once approved, content becomes visible to the user interface in real time. Rejected content is replaced with a neutral placeholder message (e.g., “The picture is rejected”), without exposing potentially harmful material.

## 5 Usage Scenario

Here, we introduce an example user scenario to illustrate the journaling and reflection workflow of our system (Figure ??). Suppose there is a user named Alex who uses the system to record personal journal entries.

**5.0.1 Phase 1: Journal writing.** Alex opens MINDFUL application and begins a new entry. The interface presents a familiar text box entry with date and headline. This straightforward layout allows Alex to focus on writing. Alex freely describes thoughts, emotions, and important events in their own words, capturing both factual and affective aspects of the experience. After completing the entry, Alex selects one of five visual styles—digital art, line art, pixel art, analog film, or neon punk—to guide AI-generated imagery using button control. Instead of crafting a detailed prompt, Alex simply chooses the style that best represents how the writing feels.

**5.0.2 Phase 2: AI-assisted reflection.** Next, Alex navigates to the “My Journals” tab to review the written entries. Upon selecting a specific entry, Alex is presented reflection tools alongside the original writing. Alex rates their mood using a five-point, icon-based scale that is quick and intuitive. After rating their mood, Alex then explores two AI-assisted reflection features. The “Help Me Reflect” option generates reflective questions based on the journal content, encouraging deeper reflection on the written journal entry. For example, after writing a journal entry about eating a bowl of hot soup while feeling sick, a moment Alex described as soothing and comforting, the system generates reflective questions such as “How did the warm soup connect you to feelings of safety and hopefulness, even while being sick?”. These prompts guide reflection on subtle,

meaningful aspects of lived experiences that might otherwise be overlooked.

In addition to textual reflection, Alex can engage in visual reflection, in which the system generates an image based on the journal entry and the selected visual style. The image captures the mood and sensory qualities of the experience such as warmth softness and calm. This visual representation helps Alex express and recall emotional nuances that may be difficult to fully articulate through text alone. By viewing these images alongside written entries, Alex is able to recall emotional states more vividly, supporting richer reflection and expressive engagement. They also use these images as anchor points to support

**5.0.3 Phase 3: Analytics and longitudinal reflection.** Over time, Alex becomes interested in understanding their emotional responses to their experiences. In the Analytics tab, Alex views a line graph showing mood ratings over time. Each data point is accompanied by the approved AI-generated image from the corresponding entry, providing visual context that supports memory recall and interpretation. By combining mood trends with visual representations of past experiences, Alex gains a deeper understanding of emotional changes over time.

## 6 Future Work

Ongoing work in this space includes systematically evaluating the long-term impact of AI-assisted expressive writing on emotional awareness, self-expression, and cognitive reframing across diverse users. We also plan to explore mechanisms that can keep users content safe and private and experiment with architectures that can leverage local instances of AI running on user machines. Additionally, in the future we intend to expand the multimodal interactions from static images to interactive visualizations could be an interesting avenue to promote deeper engagement with users thoughts and feelings.

## 7 Mindful as a Tool for Thought

Mindful contributes to the Tools for Thought paradigm by embedding two specific mechanisms that actively support deeper thinking. First, rather than simply offering a space to write, the system generates personalized reframing questions that nudge users to rethink about their lived experiences from different perspectives, turning journaling into an active thinking process. Second, AI-generated visuals offer users a way to reflect on their own emotions by surfacing feelings that words alone may not capture. Together, these interactions ensure that meaningful intermediary steps in the thinking process, such as questioning, visualizing, and mood tracking, are preserved and made explicit. In this research, Mindful explores how multimodal AI can be leveraged to support reflection through writing, rather than simply automating it.

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