Augmentiary: An Exploratory Study on Facilitating Self-reflection through AI-Augmented Journaling

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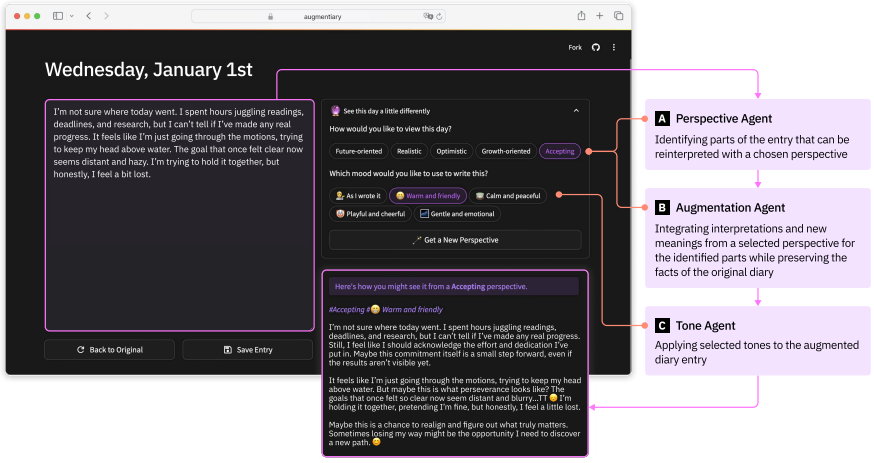

Fig. 1. System overview of Augmentiary: Users enter their diary entries and select the desired perspective and tone. **(A)** The Perspective Agent identifies parts of the user's diary that can be viewed anew through the selected perspective. **(B)** The Augmentation Agent adds the selected perspective to the identified parts and seamlessly integrates it into the diary. **(C)** The Tone Agent applies the selected tone to the expanded diary. The final augmented entry is displayed to the right of the original diary entry.

Journaling is a valuable practice for self-reflection, yet individuals often struggle to shift their perspective and derive new insights independently. To address these challenges, this study explores how people experience AI-generated augmentations in journaling, focusing on user acceptance and key human-centered design considerations. We developed Augmentiary, a technology probe leveraging LLM to offer alternative perspectives and expressive tones on diary entries. In a qualitative study with eight participants, we observed that AI suggestions aligning with users' authentic experiences and intentions fostered deeper reflection, while those that felt superficial or misaligned were naturally rejected. Comparing alternative perspectives and tones provided reflective distance, facilitating greater self-awareness. Moreover, participants' active engagement with the system led them to perceive the augmented outcomes as their own story. We emphasize the importance of balancing narrative authenticity with the integration of new perspectives, ensuring contextual sensitivity, and promoting user agency as key considerations for designing effective AI-supported reflection systems.

CCS Concepts: • **Human-centered computing** → *Interface design prototyping*; *Natural language interfaces*; **Interactive systems and tools**.

Additional Key Words and Phrases: Journaling, Self-reflection, User Agency, Human-AI Collaboration, AI Augmentation

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1 Introduction

Self-reflection is a cornerstone of personal growth, identity formation, and psychological well-being [4, 42]. It deepens as individuals consider multiple perspectives on their experiences, allowing them to derive meaning and gain deeper insights[12, 35]. However, as modern life accelerates, meaningful reflection becomes more challenging, requiring time, effort, and emotional energy. Journaling, a long-recognized reflective practice, helps individuals construct coherent narratives that connect past experiences with present circumstances and future aspirations [8, 40].

While traditional journaling has long been valued as a tool for self-reflection, its effectiveness can vary depending on individual experiences and emotional states. For some, writing about difficult events may inadvertently intensify self-criticism or reinforce negative emotional patterns [24, 42]. Re-reading past entries, especially those involving unresolved emotions, can also require considerable psychological effort [33]. In these cases, it might be difficult to construct alternative perspectives or deeper connections across experiences.

A number of studies in Human-Computer Interaction (HCI) propose digital mediation tools to enhance reflection through various intervention strategies [21, 36]. Recent research demonstrates the potential of Large Language Models (LLMs) to enrich reflection by offering alternative thoughts through their unique capabilities to reframe personal experiences [39, 45], or offering a new perspective [6, 23]. These attempts highlight LLM's capacity to shape reflection, yet little is known about how users perceive, accept, or resist AI-generated suggestions in personal meaning-making and what design considerations are needed to seamlessly integrate AI intervention in self-reflective processes. AI involvement in reflection may create tensions in how users interpret their identities and experiences, highlighting the need to understand how people perceive and respond to such interventions [5].

To build a better understanding of users' perceptions and experiences of AI augmentation in journaling, we conducted an exploratory study using a technology probe [16]. We developed Augmentiary, an AI-augmented diary system that expands a user's own narrative of their personal experience from alternative perspectives, aiming to foster reflection. Using this system, we explore the following research questions:

- **RQ1**: What makes people to accept AI-augmented perspectives when reflecting on their personal experiences, and what challenges arise in their interaction with LLM-based systems?
- **RQ2**: How should AI systems be designed to ethically and effectively support users' self-reflection?

This study provides key insights into how users perceive AI augmentation of personal experiences during self-reflection. Our findings indicate that augmentations by LLMs, particularly shifts in tone and meaning, can effectively facilitate deeper reflection. To achieve this, AI-based systems must carefully balance offering new perspectives with preserving narrative authenticity. Maintaining user agency further fosters narrative ownership and engagement. Future research should also ensure user long-term effects and ethical engagement.

2 Related Work

Reflection involves revisiting past experiences and current emotions to redefine future actions and values [12, 31]. Particularly, shifting one's way of thinking to develop new perspectives facilitates deeper reflection [35], promoting

personal meaning-making, self-understanding, and psychological well-being [28, 42]. Traditionally, journaling is recognized as a representative reflective practice. It emphasizes recalling and assigning meaning to past events, supporting emotional acceptance and stress management [8, 34]. Furthermore, the narrative identity formed through journaling helps individuals integrate their life experiences cohesively, providing a sense of continuity and unity in self-conception [30]. Nevertheless, challenges such as psychological strain from revisiting negative events, unresolved emotions, and heightened self-critical thinking hinder active perspective shifts through journaling [24, 33, 42].

HCI research has explored AI-based digital technologies to facilitate users in reconstructing or expanding their perspectives [21, 36]. For instance, systems analyze users' emotional or contextual information to suggest tailored prompts for perspective shifts [2, 22]. Others utilize LLM to reframe user-generated texts from alternative or constructive viewpoints, offering insights or interpretation users may not have independently considered [3, 39, 45]. While these AI-driven approaches demonstrate potential in deepening reflection, there remains limited understanding of users' acceptance and interpretation of AI-generated perspectives. Furthermore, concerns exist regarding the risk of LLM-generated texts distorting self-narratives or introducing biases and misinformation [23, 41]. Especially when dealing with personal identity and experiences, uncritical acceptance of AI-suggested viewpoints may undermine critical thinking and user agency required during reflection [5]. Additionally, excessively positive AI-generated text may lead to user resistance [38]. In light of these challenges, this study explores how users actually accept and interpret the new perspectives suggested by AI.

3 Method

3.1 Augmentiary: The Design Considerations

We designed Augmentiary as a technology probe to investigate how users perceive, accept, and respond to AI-augmented interpretations of their personal experiences in journaling. Technology probes serve to understand users in authentic contexts, test new technologies in real-world settings, and inspire future designs[16]. Thus, this approach allowed us to simultaneously investigate user behaviors, explore system interactions, and generate insights for future developments without the constraints of fully developed theoretical frameworks. We developed Augmentiary using GPT-4o and LangChain framework in Python, and deployed via Streamlit, the framework for delivering web-based interactive apps, as shown in Figure 1. Key features of the system include:

- **Customization**: To naturally integrate interventions within daily contexts, our system leverages user-driven customization by providing engaging choices that foster intrinsic motivation. Users write diary entries in the left pane and then customize AI-augmented output by selecting from five perspectives (Future-oriented, Realistic, Optimistic, Growth-oriented, and Accepting), inspired by concepts and approaches, including future thinking, self-growth, Acceptance and Commitment Therapy (ACT) (e.g., [9, 10, 13, 37, 43]), with five expressive tones (Original, Warm & Friendly, Calm & Peaceful, Playful & Cheerful, Soft & Emotional) to adjust emotional style. While theoretically informed, the system intentionally departs from strict adherence to established frameworks, balancing the number and diversity of options to support exploratory interactions without overwhelming users.
- **Perspective Augmentation**: When users request an augmentation, the system rewrites diary entries in first-person voice, thus ensuring augmented content remains authentic, personally relatable, and emotionally engaging. Specifically, the *Perspective Agent* identifies segments in the entry suitable for perspective expansion according to this chosen option (e.g., a 'realistic' perspective highlights objective facts, areas of control, and viable alternatives) (Figure 1-A). Next, the *Augmentation Agent* reinterprets these segments by emphasizing

relevant elements aligned with the chosen perspective (Figure 1-B). Finally, the *Tone Agent* applies the user's selected expressive tone to produce the final diary entry (Figure 1-C). Users may further iterate using different combinations of perspectives and tones, enabling the exploration of multiple viewpoints and facilitating deeper reflection.

- **Agency Preservation**: Users retain full control over their diary content, with the freedom to accept, modify, or ignore AI-generated outcomes. They can directly integrate the suggested content into their original entries or disregard it entirely. Our design explicitly preserves users' reflective agency throughout interactions.

3.2 Participants

To understand users' experiences with Augmentiary, we recruited eight participants interested in journaling. Specific recruitment criteria included: who had (1) kept a diary at least once weekly for the past six months or (2) had at least one year of consistent diary-keeping experience. Participants indicated they were moderately familiar with LLMs (M = 4.13 out of 5, SD = 0.64). Through screening, we invited eight participants (3M/5F; age of 23-29) to this study. Each participant provided informed consent and received a 30,000KRW (approximately $20) gift certificate as compensation for their active participation.

3.3 Study Procedure & Data Analysis

The study consisted of three phases: ***Phase 1)*** a one-hour pre-interview exploring participants' journaling and reflection practices, challenges, and expectations regarding AI intervention in personal writing; ***Phase 2)*** a three-day field deployment where participants used Augmentiary at least once (average total usage: 11.13 times) while freely exploring system features; and ***Phase 3)*** a 30-minute post-interview discussing overall experience, perceived effects of AI augmentations, and design improvement suggestions. Interviews were audio-recorded and transcribed (total 770 minutes), and two of the authors conducted open coding followed by thematic analysis, iterating until consensus was reached. [7, 14]. Through this process, we identified 5 themes and 20 sub-themes, capturing participants' experiences and reflections through Augmentiary.

4 Findings

4.1 Valuing Authenticity and AI Augmentation

According to our pre-interviews, journaling was viewed as a conscious effort to express one's thoughts and feelings, where purposeful articulation was essential. They also expressed concerns about losing their agency and authenticity in their diary if AI might change their original intent. (P2, P5, P6, P7)

From the analysis of our participants' experiences with the system, we found that whether they accepted or rejected AI-augmented content depended on the degree of alignment with the participant's original thoughts and expressions. Participants tended to be more accepting when the AI augmentations closely matched their intent and maintained factual accuracy (P1, P3, P4, P7, P8). Additionally, they accepted the AI-augmented entries when the AI's interpretations positively influenced their perspectives or contributed to a shift in their thinking (P1, P3~P8). *"The system wrote something like 'seeing how I've changed makes me feel proud' [...] and it actually influenced me, so I just put it in like that." (P3; post-interview)* Moreover, some participants mentioned that the AI augmentation enabled them to express their feelings and thoughts more accurately. For instance, the AI provided expressions or phrasings they hadn't considered, enabling deeper inner exploration and more precise self-expression (P1, P3, P5, P8). *"The AI suggested words I actually*

wanted to use but couldn't think of at the moment, and I really liked them, so I used them." (P5; post-interview) In these cases, the AI augmentation was a tool that facilitates a more genuine portrayal of their inner experiences.

Conversely, participants rejected AI augmentation when it distorted the factual essence of their experiences, thoughts, and feelings. Participants also rejected AI augmentation when the expressions felt stylistically inconsistent with their own writing. Furthermore, although the system was designed to avoid distorting the user's original narrative, the augmentations sometimes failed to provide meaningful reinterpretations. This limitation made some participants point out that the system failed to offer substantial insights (P1, P2, P3, P7).

4.2 Encountering New Perspectives through Shifts in Tone and Meaning

After experiencing the Augmentiary, most participants said that reading the AI-augmented entries encouraged them to revisit their past events (P1, P3~P8), consider alternative viewpoints (P1, P3~P8), and even lead to perspective changes (P3, P5, P6, P8). Also, some participants found emotional comfort in the positive framing presented by the Augmentiary. *"I remember how it rephrased things as, 'This moment might help me grow.' I agreed and recalled similar tough times. Reflecting on how I got through them, I felt like, 'Maybe everything I'm going through now will work out too.'" (P6; from post-interview) "I wrote that I didn't feel sleepy, and the AI explained it as, 'This could be a sign of overwork.' It was a perspective I hadn't considered, and it made me realize that might be the case. [...] I was impressed that it added, 'Taking good care of myself could lead to better self-esteem later on.'" (P1; post-interview)* The system's impact on triggering reflection was not solely driven by the content of the augmented entries. Some participants who chose a different tone from their original writing noted that the altered style helped them reflect on their experiences from a fresh perspective. *"Turning my diary into a playful expression really helped me shift my mindset. Something that had felt heavy suddenly felt light and making it easier to move forward." (P8; post-interview) "It felt like a different version of me had written it, but with a completely different tone." (P7; post-interview)* Comparing differences in tone and meaning created by the system served as a trigger for reflection, allowing participants to step back from their immediate thoughts and emotions and revisit their experiences with a fresh perspective.

4.3 Gaining Narrative Ownership through Agency

Participants perceived the final AI-augmented diary as their own narrative when they actively reviewed, reflected on, and selectively applied AI-generated content. (P1, P3, P7) The extent of engagement varied with the writing's personal significance, as greater significance made the augmentation feel more meaningful, increasing participation. For example, P1 mentioned engaging more with AI augmentation when it provided new perspectives on recurrent personal challenges. Additionally, some participants (P4, P8) felt a sense of ownership when the augmentation maintained factual consistency and aligned with their original intent, as long as the AI's contributions felt connected to their personal experience. However, when participants' engagement was minimal, they struggled to develop a sense of ownership over the AI-augmented diary. (P5, P6) While they recognized AI's potential to shift perspectives, they rarely integrated AI-generated entries unless these felt personally meaningful and aligned with their narrative.

5 Discussion and Future Work

5.1 Balancing Authenticity and AI Augmentation

Our findings highlight that participants embraced AI augmentations when these closely matched their intentions and expressions or constructively challenged their existing viewpoints, prompting deeper reflection through new

perspectives [12]. Conversely, augmentations conflicting with their style or distorting their experiences were rejected (Section 4.1), emphasizing tension between acceptance of insightful perspectives and wariness toward interference [6].

Participants engaged in reflection by comparing semantic and expressive differences introduced by the AI (Section 4.2). Future designs could leverage self-distancing strategies [25], enabling users to revisit their experiences from a cognitively distant perspective. As participants noted, AI-generated expressions could aid self-discovery by suggesting suitable language to articulate their thoughts and feelings. However, it remains critical to refine text-generation techniques, as overly positive or mechanical expressions can cause dissonance [3, 38]. Incorporating user feedback loops into the design, allowing users to refine stylistic or conceptual divergences, not only calibrates the system but also promotes reflection on personal tolerance for novelty and change. Meaningful AI augmentations require a deeper understanding of users' identities, emotions, and motivations within long-term contexts (e.g. [20]). Future research could evaluate the semantic distance between original entries and AI-generated augmentations to ensure the provision of insightful, non-trivial alternatives. Ethically supporting reflection thus depends on respecting user identities and intentions, ensuring AI-generated suggestions resonate authentically.

5.2 Promoting User Agency and Engagement to Preserve Narrative Ownership

Our findings indicate that participants perceived AI-augmented narratives as their own when actively deliberated on or revised the AI's input (Section 4.3). This highlights the importance of preserving and enhancing user agency in AI-supported reflection, as active involvement fosters a stronger sense of ownership and meaningful self-reflection. Therefore, future systems should promote user agency and cognitive engagement by making AI outcomes and human outcomes distinctive at the user interface level, ultimately leading users to more active thinking. One approach is to clearly distinguish between AI-generated content and user-written entries, enabling users to selectively incorporate or revise the AI's contributions in their diaries [17, 26, 27, 44]. Future research could further explore how different forms of user engagement, including emotional and cognitive engagement, affect perceived narrative ownership in AI-augmented reflection.

5.3 Ethical Implications and Future Considerations in AI-Augmented Reflection

The increasing tendency toward isolation makes AI an appealing tool for providing personal spaces [1, 15, 29, 32]. However, deeply personal domains like journaling can shape an individual's identity [11, 19], necessitating careful consideration of privacy and AI's role in self-perception. Future research must further explore how AI interventions in private domains influence identity formation and ethical concerns. Given that perceptions of AI significantly affect engagement, system design should align with users' mental models [18]. Encouraging cognitively active participation requires mitigating over-reliance on AI-generated outputs while ensuring user agency.

6 Conclusion

In conclusion, we explored users' perceptions and experiences of AI augmentation in journaling for self-reflection through an exploratory study using a technology probe. Our qualitative analysis revealed key insights into balancing authenticity and enhancing user agency to support meaningful self-reflection. Future work should involve larger, more diverse samples and longitudinal studies to examine how these systems influence self-reflection over time and address ethical considerations such as privacy and agency.

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