

Understanding Human-Diary Agent Collaboration through an Activity-Theoretical Framework

Jayalakshmi Baskar^{1*}, Vera C. Kaelin^{1,2,3} and Helena Lindgren¹

^{1*}Department of Computing Science, Umeå University, Sweden.

²Institute of Health Sciences, School of Health Sciences, OST - Eastern Switzerland University of Applied Sciences, St. Gallen, Switzerland.

³Insitute of Occupational Therapy, School of Health Sciences, Zurich University of Applied Sciences, Winterthur, Switzerland.

*Corresponding author(s). E-mail(s): jayalakshmi.baskar@umu.se;

Contributing authors: vera.kaelin@ost.ch; helena.lindgren@umu.se;

Abstract

Background: Conversational AI systems based on generative artificial intelligence (GenAI) and large language models (LLMs) are increasingly used for reflection, planning, and everyday decision-making, emerging as potential instruments for human-agent collaboration. However, how to ensure relevance and quality, and collaborative behaviour of such systems is an open question, particularly in health-related contexts.

Objective: The objective was to identify design requirements for developing a GenAI-based collaborative diary agent supporting reflection and planning through dialogue grounded in a person's activities and motives, which could serve as an instrument for diary studies in the future.

Methods: An activity-theoretical framework was used for interpreting the collaborative diary construction activity. A participatory design methodology was applied involving six occupational therapy experts. Data were collected in co-design sessions through interviews and observations of prototype use, and data was analysed using inductive content analysis.

Results: The findings highlight the importance of grounding, personalisation, explainability, emotional safety, ownership of diary content, and adaptive interaction in human-agent collaboration. The experts described the diary as a reflective tool supporting memory, self-awareness, and everyday planning. The study also identified tensions between reflection and planning, structure and flexibility, and guidance and autonomy, elicited as contradictions in the activity-theoretical framework.

Conclusion: The findings suggest that a diary post creation for health and well-being should support collaboration, contextual grounding, and meaningful participation rather than rely solely on narrative generation. The work further demonstrates the value of participatory design for developing trustworthy and human-centred collaborative AI applications.

Keywords: human-AI collaboration, collaborative diary interaction, participatory design, large language models, Cultural-historical activity theory

1 Introduction

The view on systems based on artificial intelligence (AI) is shifting from tools for automation

toward seeing them as collaborators that can support human reasoning and decision-making (Shneiderman 2022; Amershi et al. 2019; Bansal et al. 2021; Schleiger et al. 2024).

Recent advances in generative AI (GenAI), particularly large language models (LLMs), have improved the linguistic capabilities in conversational and interactive AI systems (Achiam et al. 2023; Bommasani et al. 2021). Conversational agents based on genAI and LLMs are increasingly explored in health contexts to support planning, behaviour change, and everyday decision-making (O’Neill et al. 2022; Schleiger et al. 2024; Radwan et al. 2024). Such systems enable more interactive and dialogue-based forms of human-AI collaboration, where narratives, suggestions, and interpretations may emerge through ongoing interaction rather than through static output generation alone. Opportunities of agent-based assessment of activity participation among clients are also envisioned as potential diary instrument in occupational therapy (Lindgren et al. 2024).

Despite recent advances in conversational agents, many systems still primarily operate through automatic generation, where users receive completed outputs with limited opportunities for collaborative reflection, negotiation, or iterative refinement (Serbanescu 2022). In health-related contexts requiring reflection, such interaction models may limit user participation, reduce transparency, and weaken the connection between generated narratives and the person’s lived experiences. There is therefore a need to explore AI systems that support more collaborative and iterative forms of narrative construction grounded in human-AI agent dialogue.

The aim of this research is to explore a collaborative diary agent that supports narrative reflection and planning through dialogues with a person. The focus is on how a diary system can facilitate collaborative construction and refinement of diary posts grounded in the person’s activity data. Research is guided by the following research questions:

RQ1: How can a diary agent based on GenAI be designed to support collaborative narrative construction of diary posts through human-agent dialogue?

RQ2: What purposes of the diary posts, collaboratively constructed with the diary agent, do domain experts see?

RQ3: How do domain experts experience the collaborative narrative construction of diary posts through human-agent dialogues?

To address these questions, a participatory design process involving domain experts in the occupational therapy domain was conducted, aimed at designing and evaluating a collaborative diary agent grounded in user activity data and the person’s goals and preferences. Further, research was guided by the Cultural-Historical Activity Theory (Engeström et al. 1999).

The contributions of this research are the following:

1. An activity-theoretical conceptualisation of human-diary agent collaboration.
2. Participatory design findings concerning grounding, explainability, emotional safety, ownership, and adaptive interaction.
3. Design implications for collaborative AI systems in health and well-being contexts.
4. An initial design and implementation of an exploratory collaborative diary agent grounded in a person’s activity and motives.

The article is organised as follows. Section 2 discusses related work. Section 3 describes the methodology and theoretical framework. Section 4 presents the design, implementation, and findings. Section 5 discusses the results. Section 6 concludes the paper and outlines future work.

2 Related Work

Research elicits that Human-AI collaboration requires shared processes of interaction and co-adaptation rather than simply automate tasks or generate outputs independently. Seeber et al. (2020), for example, frame collaborative intelligence as an ongoing process in which humans and AI systems complement each other through coordination and mutual adaptation. Similarly, Shneiderman (2022) argues for human-centered AI systems that preserve human agency and meaningful control instead of replacing human judgment with autonomous decision-making.

Prior work on collaborative writing and LLM co-creativity highlights iterative cycles of prompting, reviewing, and revising, where a person continuously shape generated content during interaction rather than receiving fully autonomous

outputs (Clark et al. 2018; Wan et al. 2024). Within health and well-being contexts, collaborative interaction additionally requires contextual understanding, adaptation, and sensitivity to the person’s experiences (Kaelin et al. 2024; Lindgren et al. 2024).

Although LLMs enable increasingly conversational and personalized interaction, concerns regarding hallucinations, generic outputs, and weak contextual grounding remain significant challenges. Hicks et al. (2024) argue that LLM-generated content may produce convincing but unreliable interpretations, while Kenthapadi et al. (2024) emphasize grounding as a central challenge for trustworthy LLM-based systems.

These limitations become particularly important in health-related contexts, where a person could interpret generated narratives as representations of their own experiences and routines. Prior research on conversational health agents shows that users expect interactions to remain contextually relevant and grounded in personally meaningful information rather than generic recommendations (Laranjo et al. 2018; Fitzpatrick et al. 2017). Ehsan et al. (2021) further argue that explanations in human-AI systems should support collaborative understanding and negotiation rather than merely expose system details.

Research on personal informatics has similarly highlighted the importance of grounding interaction in longitudinal activity data and lived experiences (Li et al. 2010). This perspective aligns with ontology-supported contextual representations explored in (Lindgren and Yan 2015; Baskar et al. 2025, 2026). However, prior work has mainly focused on improving generation quality or grounding, not on the complexity of the situation in which the activity takes place. Planning and everyday activities can be understood as purposeful and socially situated activities shaped by context, motives, prior experiences, and mediating tools (Kaptelinin and Nardi 2006). Engeström (2001) emphasizes that human activity develops through negotiation and transformation over time, and extends the systemic model of human activity to include division of labour, rules and regulations governing activity.

From this perspective, interaction with AI agents can be understood not simply as information exchange, but as participation in a mediated activity oriented towards an objective. The diary

entry itself may therefore be understood as an evolving artifact constructed jointly through dialogue between the person and the AI agent.

3 Methodology

This study adopts a participatory design methodology involving domain experts, using qualitative data collection and analysis. Further, the Cultural-Historical Activity Theory (CHAT) is applied to interpret the human-agent collaboration activity (Engeström 2001). The study design is presented in the following sub-section and CHAT in Section 3.2.

3.1 Participatory Design

The participatory design process consisted of two phases: an exploratory design phase and a prototype evaluation phase.

In Phase 1, six occupational therapy experts participated in individual semi-structured co-design sessions exploring how a diary agent could support reflection and planning. The researchers introduced diary agent concepts and interface mock-ups, and participants provided feedback on interaction flow, narrative structure, reflective feedback, and the organisation of diary entries into past and future categories. The findings informed the design of the collaborative diary agent and its interaction flow.

In Phase 2, the experts used the diary prototype embedded in the BlumeAI mobile application over one week. Participants logged activities, collaborated with the diary agent to generate reflective, and future-oriented diary posts. Follow-up co-design sessions were then conducted to gather reflections regarding experiences, limitations, and future improvements of the system.

3.1.1 Participants

Six occupational therapy experts with experience in rehabilitation, health technology, and research participated in the co-design process. All participants provided written informed consent. The sessions were conducted by researchers with expertise in occupational therapy, AI, and human-computer interaction. Occupational therapy experts with expertise in rehabilitation and supporting patients with reflection and everyday activity planning in health-related contexts were included. They

contributed with design knowledge and clinical insight, and brief first-person lived experience of a prototype system.

3.1.2 Data Collection and Analysis

Data were collected through recorded co-design sessions. The recorded co-design sessions were transcribed and, together with participant interactions with the prototype system, and researcher notes analysed using inductive content analysis (Elo and Kyngäs 2008).

Initially, the first author undertook a detailed line-by-line review of the transcripts, collected notes and interaction data to ensure familiarity with the data. During this phase, notes denoting "condensed meaning units" were recorded alongside relevant segments of the text data. These condensed meaning units were subsequently refined and organized into preliminary subcategories based on shared patterns of meaning.

The analytic process was iterative, with subcategories continuously developed, revised, and compared. In the final stage of abstraction, subcategories were synthesized into broader categories, which were then further integrated into overarching main categories. A comprehensive report was prepared to present the findings concerning participants' experiences of interacting with the prototype system including the collaborative diary agent.

The purpose of the study was exploratory rather than comparative or evaluative. The work does not aim to validate long-term human-AI collaboration outcomes, but to investigate how domain experts experienced interacting with the prototype system including the diary module and collaborative diary agent, functioning as prompt and inspiration for design work.

3.2 Theoretical Framework

The diary agent design is informed by activity theory, which conceptualises human activity as purposeful, socially situated, and directed toward meaningful goals and motives (Kaptelinin and Nardi 2006; Engeström et al. 1999). Activity theory provides a framework for understanding how reflection, planning, and everyday activities are grounded in the person's lived experiences and contextual circumstances. The theory also informed how the system represents activities,

motivations, contextual factors, and interaction purposes during interaction. From the cultural-historical activity-theoretical perspective, the collaborative task of creating a diary post with a particular purpose involving the person and the diary agent constitutes the central activity, constrained by the actors, their tools, the division of tasks and responsibilities, and rules and regulations (Engeström 2001). The evolving diary post represents the shared evolving artefact emerging through the collaboration, which is transformed into the outcome of the activity. Consequently, there is a distinction between the dialogue-based collaboration, and the diary narrative being collaboratively constructed through that dialogue. The collaborative process involves not only generating diary content, but also clarifying interpretations, negotiating and refining meanings, and shaping diary narratives together through iterative modifications of the draft of a dialogue post.

4 Results

The results of Phase 1 of the design process is presented in Section 4.1, the design of the diary agent and its implementation in Section 4.2, and the findings of Phase 2 related to the domain experts' experiences from using the app in daily activities are presented in Section 4.3.

4.1 Phase 1: Domain Experts' Perspectives on Design

The Phase 1 analysis identified nine main categories reflecting recurring design considerations: 1) purpose-driven and context dependent use, 2) structured yet flexible dialogue, 3) personalization and adaptive interaction, 4) reflection as recognition, learning, and pattern awareness, 5) the relationship between reflection and planning, 6) balancing motivation, goals, and psychological safety, 7) usability and accessibility, 8) privacy, ownership, and controlled sharing, and 9) engagement and long-term use.

Purpose-driven and context-dependent use
Experts described the need for a diary agent that could support both retrospective reflection and prospective planning. The perceived usefulness of such a system depended on the person's goals,

health conditions, and personal preferences. Some participants emphasised reflection and meaning-making, while others prioritised structured planning and behavioural support. The diary concept was also viewed as an “external memory” supporting self-awareness and everyday reflection.

Structured yet flexible dialogue

All sessions highlighted the need for guided but flexible interaction. Experts recommended beginning with open prompts, followed by context-aware follow-up questions, while allowing users to refine or correct generated content.

Light structure, such as keywords or thematic categories related to the conversation, was seen as helpful, provided it does not constrain personal expression. The consistent requirement was that the system should guide without restricting. Experts also highlighted temporal flexibility as important. Users should be able to retrospectively add activities they forgot to log, modify future plans, and “catch up” on entries later rather than being forced into rigid daily reporting routines. Reflective prompts and clarification questions were viewed as supporting collaborative diary construction.

Personalisation and adaptive interaction

Personalisation was identified as essential. The system should adapt to user preferences, prior knowledge, cognitive and physical abilities, and personality.

Experts noted that some users may seek explanatory feedback, while others may prefer more actionable guidance. The system therefore needs adaptive levels of structure and support tailored to individual preferences and abilities.

Reflection as recognition, learning, and pattern awareness

Experts described reflection as serving three distinct but related functions.

First, recognition: the diary should help users acknowledge what they have accomplished, countering perceptions of inactivity.

Second, learning: reflection should support understanding of why outcomes occurred and how contextual factors, such as stress or routine, influenced behaviour.

Third, pattern awareness: the system should help users identify trends over time. One expert

described how grouping activities together in earlier diary studies sometimes created “aha” experiences for older adults, for example by revealing that they had spent most of the week at home without previously realising it. To support this kind of reflective insight, experts suggested combining narrative summaries with lightweight visualisations. One expert described how the reflective process itself became meaningful beyond the original behavioural goal: “what I actually missed about that period was not actually the jogging, it was actually the reflective part”. Similarly, another expert suggested that revisiting diary histories could help users “see some patterns in their daily activities” and better understand changes in routines, activity engagement, or social participation over time.

Together, these functions position the diary as a tool for self-awareness and iterative learning, not merely documentation.

The relationship between reflection and planning

Experts held complementary but distinct views on how reflection and planning relate. Some described a direct sequence: reflection informs immediate planning for the following period. Others emphasised a conceptual distinction between understanding the past and deciding on future action. Despite this variation, all agreed that past experience should ground future planning.

Experts also noted that planning can be more cognitively demanding than reflection, and may require stronger system support, including suggestions, multiple options, and realistic goal-setting guidance.

Balancing motivation, goals, and psychological safety

Goal-setting was seen as both motivating and potentially harmful. While goals can encourage progress toward a desired outcome, they can also create pressure and discourage users when goals are not achieved.

The experts recommended that the system should begin with small, achievable steps, allow users to control goal-setting, and adapt based on progress and feedback.

A recurring concern was the emotional risk of reflection: comparing past and present abilities may reinforce feelings of decline, and repeated

unmet plans may produce guilt. The system should therefore avoid negative framing, highlight achievements and possibilities, and support adaptation rather than comparison. One expert emphasized that unsuccessful attempts should be treated as part of reflective learning rather than failure: “you are going to fail, but you should not feel bad about it because it’s part of the learning process”. Emotional safety was identified as a fundamental design requirement. Relatedly, one expert stressed that future-oriented planning should remain open and non-demanding. Constant goal-setting was considered potentially stressful in everyday life. Experts therefore preferred reflective prompts framed around possibilities, wishes, or necessary tasks rather than rigid productivity expectations.

Usability and accessibility

Experts specified several usability requirements: plain language, concise narratives, large readable text, and minimal cognitive load.

Additional recommendations included voice input support, visual elements such as icons or images, and layered views allowing users to move from a quick overview to more detailed exploration.

These requirements reflect the need to serve users with varying literacy, cognitive capacity, and digital experience. Experts also emphasized the importance of offering multiple representation formats to present the past and planned activities. Some users may prefer narrative diary-style summaries, while others may benefit from bullet-point overviews or more quantitative representations. The ability to switch between different forms of presentation was viewed as important for accessibility and personal preference.

Privacy, ownership, and controlled sharing

Experts consistently viewed diary content as highly personal and sensitive. While sharing diary reflections with healthcare professionals or researchers was considered potentially valuable, experts emphasized that such sharing should never be the default. Users should retain ownership and control over their data, with sharing occurring only through explicit consent and secure mechanisms. Some experts also envisioned the diary as a collaborative reflection tool that could support discussions between users and

occupational therapists, while still preserving personal privacy and autonomy.

Engagement and long-term use

Experts suggested that people may continue using the diary if they find it useful, easy to include in daily life, and supported by timely prompts. Experts noted that initial motivation may be high, but long-term use requires continued value. Optional gamification, the ability to revisit past entries, and use of the diary as a personal archive were proposed as supporting strategies.

Based on the Phase 1 findings and the theoretical framework, the diary agent was designed as a collaborative reflective system supporting iterative diary construction through dialogue.

4.2 Interaction Design and Implementation

Based on the theoretical framework and results from Phase 1, the diary agent and module was implemented with a focus on the co-construction of a diary post grounded in the individual’s activity information and preferences, in particular, on their motive for creating a particular diary post. Further, to facilitate both reflection on past activities and their subjective experiences of effects, and on envisioning the future activities.

In the following sections grounding the collaboration in the person’s motives and goals is presented, and collaborative construction of diary posts with purpose in Section 4.2.2.

4.2.1 Grounding the Collaboration in the Person’s Motives and Goals

The diary agent was implemented as a module embedded in the BlumeAI mobile application building on (Lindgren and Kilic 2025). The BlumeAI app provides support for lifestyle changes to improve health with a focus on daily activities, embedding an ontology for representing purposeful activities related to physical, social, recovery, and everyday activities (Lindgren and Weck 2022). The information collected in BlumeAI on the person’s activities and motives for these, is used as instrument by the diary agent in the co-creation of diary posts.

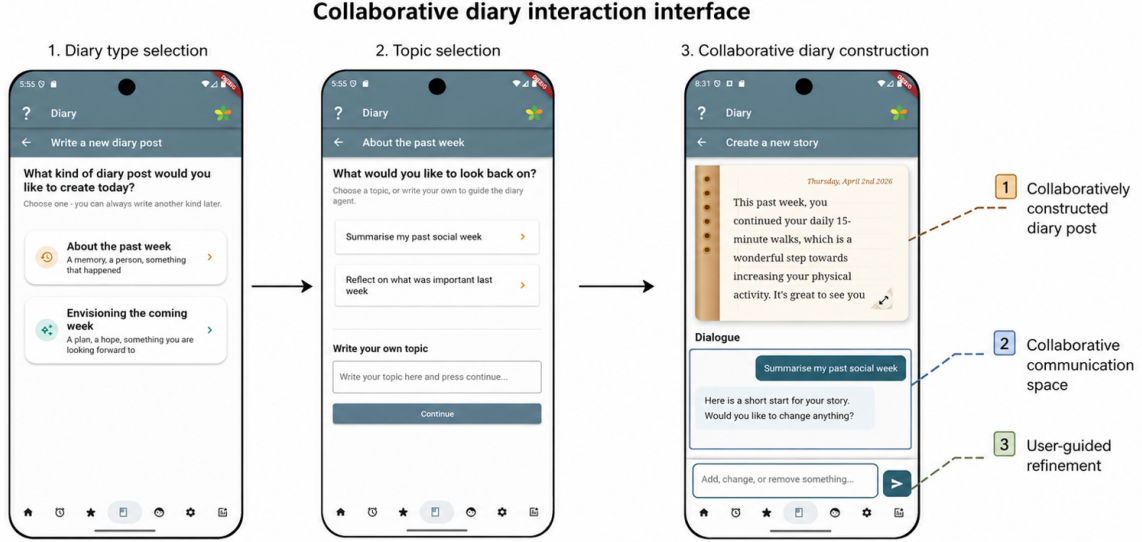


Fig. 1 Diary interaction interface illustrating the distinction between the collaboratively constructed diary post and dialogue space used for iterative refinement and clarification.

The diary module separates reflections on past activities from envisioning futures in a form of planning.

The distinction between reflections on past experiences and future-oriented planning was also informed by earlier exploratory work on dialogue purposes in collaborative storytelling systems (Baskar et al. 2026). While earlier work explored multiple dialogue purposes, the present study groups diary interaction into reflections on past activities and planning of future activities, while still allowing the person to define their own purpose for each diary post.

To create the initial draft of a diary post, the system retrieves person-specific activity information from the BlumeAI platform and transforms it into a structured prompt together with the person’s specific motive for the diary post, and submitted to the LLM (GPT-4o-mini). During subsequent interaction turns, the previously generated narrative together with the person’s reflections and comments is re-submitted to the LLM model supporting iterative refinement while preserving narrative continuity. The diary agent may additionally ask clarification questions to support collaborative dialogue.

The person can iteratively modify, extend, or refine generated diary posts in collaboration with the agent. This also allows for the diary posts to be aligned with their motives and preferences.

4.2.2 Collaborative Construction of Diary Posts with Purpose

The diary interaction is designed as a collaborative activity in which the user and the diary agent iteratively construct and refine diary narratives grounded in user activity information collected through the BlumeAI application, and diary post purpose defined by the person as the initiation of the diary post creation activity.

The design of the interface distinguishes between the *Diary post creation space*, which contains the diary post artifact to become the outcome of the collaborative activity, and the *Collaborative communication space*, which enables collaboration (Figure 1). It allows the human and the diary agent to elaborate on the diary post draft as well as organize and agree on what to do next in their collaboration.

Experts described diary usage as consisting of two separate activities: creating new diary posts through dialogue with the diary agent and revisiting previously stored diary posts. Stored diary posts were envisioned as being organized into posts about the past and posts about the future.

The collaborative creation of a diary post aligning with the purpose defined by the person was analyzed based on the cultural-historical activity-theoretical (CHAT) (Engeström et al. 1999). Key elements are 1) the *actors*, the human and diary agent; 2) the *instruments*, most notably

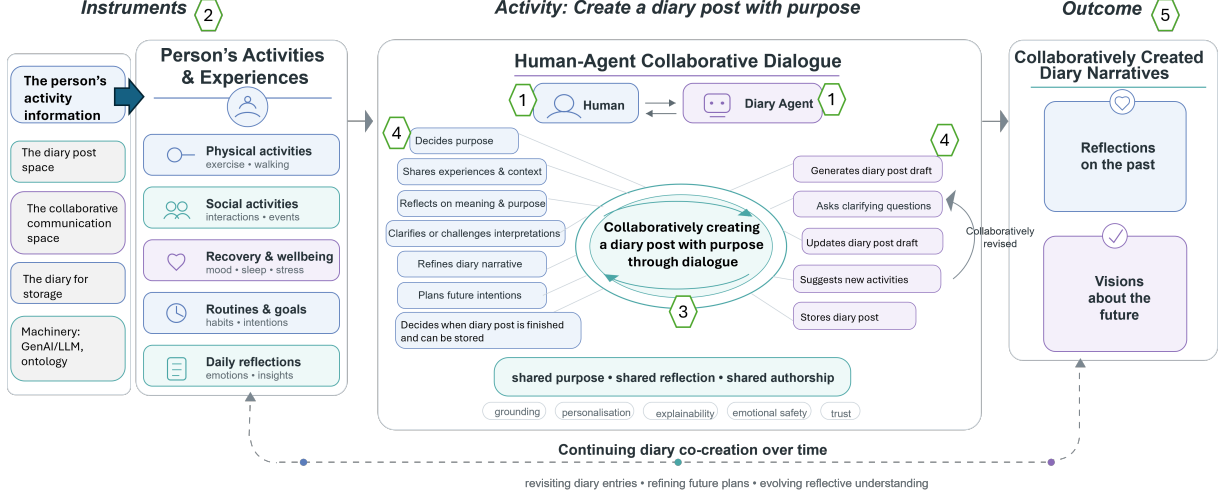


Fig. 2 Overview of the collaborative creation of diary post with purpose, interpreted following the Cultural-Historical Activity Theory (Engeström 2001).

the person’s activity information; 3) the *objective* – the collaborative creation of a diary post aligning with the purpose defined by the human; 4) how *the division of tasks and responsibilities* are implemented; and 5) the *outcome* forming content in the diary (Figure 2).

The activity is composed of the following tasks and responsibilities.

The person initiates the collaborative activity by deciding on the purpose of the diary post. To support the person in doing this, there are pre-defined example purposes, aligning with different types of argumentation dialogue purposes. The person can also write their own purpose.

The agent’s task next is to propose an initial version of the diary post based on the purpose and the person’s activity information.

After the initiation of the collaborative process of co-constructing a diary post, the person and the agent iterate the draft, where the person may confirm, revise, clarify, or extend the generated narrative to better reflect personal experiences and intentions. The agent may ask questions to clarify intentions.

The person decides when the diary post is finalized, and agrees to the agent’s suggestion to store the diary post.

The agent finalizes the co-construction of the diary post by storing it in the diary repository.

4.3 Phase 2: Experts’ Experiences from Using the Diary

The second phase explored how the six experts experienced using the diary agent in practice over over a week. The participants interacted with the BlumeAI app creating and logging activities, and with the diary module generating diary posts in collaboration with the agent. Four main categories were the results of Phase 2: 1) reflection, ownership, and personalization, 2) explainability and argumentative dialogue, 3) reflection versus planning, and 4) adaptive coaching and trust.

Reflection, ownership, and personalisation

Five of the six experts described the diary as a reflective memory tool rather than merely an activity logger. Participants expected revisitable diary histories that could support comparison, continuity, and behavioural reflection over time. One participant suggested that revisiting diary histories could support reflection by allowing users “to compare it... how I felt then and how I felt now.” Several experts highlighted the importance of being able to revisit and compare diary entries over time, describing this as an important aspect of supporting long-term reflection and awareness of personal development.

Four experts also emphasized the importance of stronger personalisation and contextual grounding. Generated stories were frequently experienced

as generic, repetitive, or disconnected from lived experience. Some participants noted that the system repeatedly suggested stereotypical health-oriented activities such as mindfulness or exercise even when other personally meaningful activities were more relevant. Others observed that the system occasionally introduced assumptions that did not correspond to actual logged activities.

Three experts further stressed that diary narratives should preserve a sense of personal ownership. Fully AI-generated stories were sometimes experienced as detached from the user’s identity, leading participants to suggest that users should also be able to write parts of the diary in their own words. As one participant explained, “If a chatbot always writes the entries, it doesn’t really feel like your own diary.” One of the domain experts used this as a strategy, writing parts of the diary post, asking the agent to revise the post accordingly.

Explainability and collaborative dialogue

Two experts strongly emphasized the need for explainability and argumentative reasoning in the collaborative creation of a diary post. They questioned how the system arrived at conclusions such as “limited physical activity” and expected the agent to justify such statements using evidence from logged activities, questionnaire responses, or emotional ratings.

The same experts also expected the interaction to support negotiation and revision rather than only story generation. They wanted the possibility to challenge the system’s assumptions, clarify misunderstandings, and collaboratively revise interpretations through dialogue.

Three experts further criticized the current diary post creation as overly rigid and goal-oriented. Instead of engaging in reasoning, the diary agent repeatedly attempted to finalize and save the diary story. Due to this, they experienced the interaction as insufficiently collaborative and lacking deeper reflective support. One participant described the agent as insufficiently collaborative, explaining that “it just does its own thing, I do my thing.” These findings indicate that explainability and argument-based reasoning represent important future requirements for collaborative AI systems beyond the capabilities currently implemented in the prototype.

Reflection versus planning

Four experts distinguished clearly between reflection about past experiences and planning for future activities. Narrative diary text was considered appropriate for reflecting on past experiences, while future-oriented planning was expected in more structured formats such as lists, bullet points, or checklists.

Three experts described planning support as potentially valuable for organizing routines and identifying forgotten activities. One participant compared the process to grocery-list planning, where seeing an overview of planned activities helps reveal what is missing. Participants suggested that the diary agent should therefore support iterative planning where the person can revise, add, or reorganize planned activities over time.

Two experts additionally highlighted that reflective evaluations after activities may be more meaningful than anticipated feelings before activities occur. Activities such as exercise may initially feel unpleasant but later produce satisfaction and pride, making post-activity reflection particularly important for understanding motivation and behavioural outcomes.

Adaptive coaching and trust

Several experts envisioned the diary agent as an adaptive reflective coach rather than a passive storytelling tool. These participants appreciated the potential for reminders, progress tracking, and contextual encouragement connected to personal routines and habits. Two experts specifically preferred reminders grounded in behavioural patterns, such as physical activity or nutrition habits, rather than generic notifications.

One expert further described conversational coaching as meaningful when the agent encouraged reflection rather than issuing commands. Reflective questions concerning motivations, barriers, priorities, and values were experienced as more useful than standardized health advice.

Privacy and trust also emerged as important concerns. Three experts emphasized that the diary should primarily function as a personal reflective space rather than a therapist-monitoring system. At the same time, two experts suggested that selected summaries or visual overviews could still support therapeutic conversations if voluntarily shared during clinical meetings.

Overall, the findings suggest that the experts envisioned the collaborative diary agent and connected diary as a facilitator for reflection, requiring contextual grounding, explainability, adaptive interaction, and meaningful human engagement beyond passive narrative presentation.

5 Discussion

The participants in the participatory design process were occupational therapy experts, with experience of assessing the need of supporting activity with person-tailored tools among clients including older adults, and applying paper-based diary studies to explore activity participation among clients. Besides envisioning an agent-based diary instrument for activity assessment, they also contributed with the diversity perspective. The results are formative, covering aspects needed to improve the system, and making it sufficiently adaptive before involving older adults in the further development and evaluation of the system.

The work contributes with an investigation of requirements and design implications for collaborative diary post creation. The findings highlighted the importance of grounding and trust as design requirements for collaborative AI systems. The participating experts expected diary narratives to remain closely connected to the person’s own activities, routines, and lived experiences. Stories that appeared generic, repetitive, or disconnected from actual experiences were perceived as less meaningful and less trustworthy. These findings align with prior work emphasizing the importance of grounding and transparency in human-AI collaboration and dialogue-based interaction (Vössing et al. 2022; Kenthapadi et al. 2024). The findings additionally suggest that the experts expect opportunities to challenge, influence and negotiate generated narratives during interaction rather than simply receiving completed outputs from the system, aligning with contradictions leading to development in the perspective of CHAT (Engeström 2001).

The findings revealed several additional important design tensions in collaborative diary post creation. Participants emphasized the need to balance guidance and autonomy, structure and flexibility, as well as motivation and emotional safety. Ownership of the information was highlighted as important, which elicited the contradiction

between the person’s motive, and the OT experts’ aim for diary studies of activity participation (Kaptelinin et al. 2026).

Reflective reminders and conversational support that encouraged exploration and self-awareness were preferred over rigid goal-oriented guidance. These findings suggest that collaborative AI systems may require adaptive interaction styles depending on purpose of a dialogue, emotional context, and the person’s preference.

The study remains exploratory and has several limitations. The prototype was partly implemented serving as an instrument for reflection during sessions and use, which may prevent the participants to think more broadly about potential design directions. Further, the participatory design sessions did not involve older adults, who may have contributed with substantially different perspective on design and purpose. Older adults’ perspectives were explored in a previous study (Baskar et al. 2026), however, older adults will be engaged in a next phase, when they can evaluate an improved version of the system, taking the findings in the presented study into account. The perspectives of diary users, including older adults with varying cognitive and digital literacy levels, remain to be studied. The findings should therefore be interpreted as early design implications for collaborative AI systems.

Unlike conventional conversational systems that focus on generating responses, the proposed diary interaction supports iterative clarification, negotiation, revision, and refinement of diary narratives, allowing the person to continuously influence both content and purpose during interaction. The work therefore explores a transition from AI as passive tool toward AI as collaborative partner.

Taken together, the findings suggest that collaborative AI systems may require fundamentally different interaction principles than traditional assistive conversational systems. Rather than optimizing only generation quality or task completion, collaborative systems may need to support negotiation, shared interpretation, evolving authorship, contextual grounding, and emotionally safe participation over time.

Future work will further explore grounding, explainability, and adaptive interaction strategies for collaborative diary systems.

6 Conclusions and Future Work

This paper explored a collaborative diary agent supporting reflection and planning through dialogue grounded in a person’s activities and experiences. Participatory design with occupational therapy experts identified important requirements for collaborative interaction, including grounding, explainability, emotional safety, adaptive interaction, and user participation.

The work contributes early conceptual and empirical foundations for collaborative diary interaction in health and well-being contexts. Future work will involve evaluation with older adults and further exploration of grounding, explainability, and adaptive interaction.

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- Materials availability: Not applicable.
- Code availability: Not applicable.
- Author contribution: JB contributed to implementation, and manuscript preparation. JB, VK, HL contributed to study design, analysis, discussions and manuscript revisions.

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