Summary

This paper examines the potential for a gamified mental health application, to support young adults experiencing mild mental health challenges by encouraging structured engagement, reflection, and gentle motivation. The research paper begins by highlighting recent statistics from Danish health authorities, which reveal mental health concerns among young adults. Neglecting mental health can lead to a range of adverse outcomes, including impaired daily functioning and societal costs. While digital mental health tools pose as a promising way to bridge gaps in traditional therapy, challenges around user engagement persist. To address these limitations, existing research suggests gamification and virtual companions. These can foster emotional attachment and self-compassion, thereby motivating users to sustain self-care practices.

Guided by four design implications derived from a preliminary scoping review, Mindly was developed to integrate insights from prior work and to evaluate how a gamified interface might help young adults form healthier routines. Built in the Godot 4 engine with Firebase handling user data and authentication, the application presents an isometric 2D environment in which users log daily activities and earn experience points (XP) for activity completion. As users level up, they unlock virtual furniture for a companion's room, choosing between color variants to personalize the space. A companion avatar, styled to evoke nostalgia, unpacks items gradually as the user progresses, reinforcing a narrative of collaborative growth. Users can also record reflections about their mood in a dedicated calendar view. Lastly, a wilting virtual plant, serves as a gentle reminder if the application is not accessed for a day.

Mindly was evaluated during a week-long field study with five participants who represented varied backgrounds and situations. The user studies were preceded by pre-interviews to discuss daily routines, while the evaluation of Mindly itself, involved downloading Mindly on the participants' Android devices and encouraging participants to use the application as they saw fit. Subsequently, post-interview were held to ask about the test period. Usage data drawn from Firebase revealed an average of 2.8 logins per day, although engagement varied. An example being one 'super-user' with prior experience in a similar application created and completed more activities than the others. Interview data showed that participants typically engaged with Mindly in the morning, late afternoon, and evening, aligning with planning, checking progress, and reviewing activities. Participants reported that Mindly's structure helped them organize their day and, in some cases, enabled them to allocate time to hobbies or chores they might otherwise neglect. The act of structuring their day and re-considering activities fostered mindfulness and reflections.

Five key themes emerged from a thematic analysis of the interview and usage data. First, *Patterns of Usage* highlighted varied engagement styles: some users integrated the application deeply into routines, while others used it sporadically as reminders. Second, *Structure in Daily Life* underscored how Mindly's activity list and reflection calendar served as organizational tools, prompting users to break overwhelming tasks into manageable parts and to reflect on their emotional state. Third, *Establishing a Parasocial Relationship* revealed that participants enjoyed the companion's animations and narrative, yet desired more interactivity and customization, suggesting room for deeper emotional connection. Fourth, *Engaging and Retaining Users* demonstrated that gamification, particularly earning XP and unlocking furniture, motivated many participants, but risked causing stress if pushed further or potentially perceived as too demanding; the reflection feature remained underused, likely because it did not reward XP. Finally, *Advice*

for Mental Health Applications gathered participant suggestions for optimizing performance, clarifying activity categories, improving the reflections interface, and preserving simplicity to prevent feature "noise."

In discussing these findings, the paper revisits the pre-specializations design implications. The paper indicates that personalization and simplicity are crucial, as evidenced by participants' enjoyment of decorating the companion's room and their preference for a tool with a clear, singular purpose. While avoiding performance-driven features generally benefited users, the study also showed that subtle progress indicators could still evoke self-comparison, underscoring the delicate balance required when implementing gamification. By combining collaborative narratives with soft nudges, such as the wilting plant, Mindly managed to support users without imposing undue pressure. Furthermore, Mindly is compared to existing applications like Finch, Habitica, and Daylio, noting that Mindly's incorporation of the 10 H's framework and its gentle gamification differentiate it from competitors that rely more heavily on streaks, achievements, or extensive metrics.

Limitations of the study include the smaller sample size of participants and short test duration, which may not capture long-term engagement patterns or sustained effects on mental health routines. Future research could explore optimal levels of gamification and investigate how richer personality elements for the virtual companion might strengthen user attachment.

In conclusion, the paper demonstrates that a gamified mental health tool with a virtual companion can foster self-care routines among young adults by providing structure, encouraging mindful reflection, and offering personalized, emotionally supportive interactions. With careful balancing of gamification and simplicity, applications like Mindly have the potential to sustain user engagement and promote healthier daily habits.

Leveling Up Self-Care: How a Gamified Approach to Mental Health Applications can Support Young Adults

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Abstract

This paper explores how a gamified mental health application can support young adults with mild mental health challenges in cultivating their mental health through structured engagement, reflection, and gentle motivation. Drawing from prior research and design implications, Mindly was developed to evaluate and discover interesting interactions through a week-long user study involving five participants. Findings indicate that users responded positively to the application's structure, personalization, and emotionally supportive companion. The study reveals that gamification and parasocial relationships serve as key motivators, but also highlights the importance of balancing these elements to avoid inducing stress or performance pressure. Furthermore, this research demonstrates how mental health applications can support young adults through engagement, structure, and personalization.

1 Introduction

Sundhedsstyrelsen (Danish Health Authority) in their national study from 2023 found that women between the ages of 16-34 and men between 25-34 most frequently score low on the mental health score. The reported frequency ranging between 25-35 percent within these groups [39]. In 2021 *Psykiatrifonden* (Danish Mental Health Fund), found that anxiety, as well as affective- and addictive disorders are among the most common afflictions [38].

Neglecting mental health can lead to poor physical health [32] [33], difficulties in daily functioning, sustaining relationships, maintaining employment, performing tasks [52], and can lead to societal impacts such as, healthcare costs and reduced productivity [42].

In recent years, technology is playing an increasing role in mental health interventions, offering both promising solutions [31] and significant challenges [2]. Digital tools for mental health have the potential to make mental health care more accessible and scalable, especially for individuals who encounter barriers to traditional therapy [31]. However, concerns around engagement, accuracy, and ethical considerations remain key obstacles to their widespread adoption [22]. Additionally, chatbots and AI-driven solutions lack human emotional depth, which can make them feel impersonal and inadequate for those seeking meaningful psychological support [18].

To address some of these limitations, researchers and designers are exploring more interactive, emotionally engaging approaches to digital mental health support. Gamification, virtual companions, and digital pets have emerged as potential solutions to increase user engagement and encourage positive behavioral change, as well as having positive effects

on individuals facing mental health challenges [7] [41] [11]. These studies argue that the virtual companion become a motivator for the user by creating emotional attachment, and by incorporating elements of care, responsibility, and companionship. Additionally, research indicates that caring for another entity can enhance self-compassion [24], and that the parasocial relationship between user and virtual companion is a key reason for the success of such tools [13].

Therefore, this paper strives to investigate the following research question:

> *"How can a mental health application with a virtual companion support young adults, with mild mental health challenges, cultivate mental health routines and self-care practices?"*

This paper builds on our pre-specialization project, *How Technology Aids Young Adults with Mental Health Challenges: A Scoping Review* [19], and is structured as follows. First, we review related work to position our study within the existing field. Next, we introduce our methods, including the development of a mental health application that incorporates a virtual companion, and the underlying theories this application includes. We then present the analysis and findings from our user study, which included pre- and post-interviews as well as week-long evaluations. Finally, we discuss the implications of our findings and conclude the paper.

2 Related Work

In our previous study, we investigated how technology can support mental health challenges [19]. Through this investigation, we learned that individuals often suffer from trying to live up to perceived expectations, and need guidance when it comes to resource management and self-care practices. Examples of current non-technical solutions to address these issues are, encouraging reflection of daily tasks, as seen in the 10 H's [26], training individuals to take scheduled breaks, and establishing boundaries around work hours. Research related to mental health has focused upon mental health routines and self-care practices, categorizing these into five primary structures [23], namely physical, psychological and emotional, social, leisure, and spiritual. These categories have been investigated in the context of technology to support older adults [6], but not for younger adults. The same sentiments, categories, and approaches can be recognized in existing mental health focused applications, which offer guided meditation, relaxation, mindfulness courses, (AI)-therapy [48], moodjournaling [45, 44] and are facilitators for healthy habit-building [45, 47]. The latter two, Finch [45] and Habitica [47], also employ the strategy of gamification to motivate users. In particular Finch [45] stands out in this regard, employing a virtual companion.

Virtual companions can serve as a motivator for people, encouraging individuals to adhere to their daily mental health routines. This effect is attributed to the emotional attachment users develop toward their virtual pets [20]. Various technologies have been employed to develop virtual companions. For example, Na et al. have used mixed reality (MR) to create a virtual cat [28]. They conclude that MR simulations of a cat can serve as an effective stress-reduction tool. Similarly, Norouzi et al. have created a virtual dog using augmented reality (AR), which has the potential to support individuals in stressful situations [30]. Moreover, they discovered that participants preferred virtual dogs to virtual humans, as they experienced reduced feelings of judgment and greater psychological comfort with the virtual animal. Further research into virtual companions highlights the importance of anthropomorphism, as demonstrated by Duffy, who argues that robots become more socially acceptable and trusted when they embody human-like features [9]. Duffy emphasizes that employing anthropomorphic paradigms can enhance social interactions between humans and robots, allowing people to re-

late to and rationalize robotic actions more intuitively. Geurts and Luyten describe the taxonomy of anthropomorphism as three categories, appearance, behavior, and personality [14]. These categories effect the perception of the companion, and each may influence the other. As such, the relationship between user and companion must be designed around these three concepts.

While research has focused on budding technologies in the context of mental health, e.g. AI-driven chatbots, wearable sensors [19], experimenting with virtual companions in mixed reality (MR) [28] and augmented reality (AR) [30], the most commonly available mental health tools are developed as mobile applications [48, 45, 44, 47]. This lack of research, raises questions about what makes mobile mental health applications popular and how they engage and retain users.

Similarly, this gap of knowledge needs to be further investigated as [3, 12, 22] highlight the need to investigate how to retain and engage users, and a need for human-centered design to improve the effectiveness of digital mental health solutions. From these gaps in research we initiated our previous study [19] which concluded that:

1. Digital Mental Health Tools could be flexible and adaptable to the needs and preferences of users
2. Digital Mental Health Tools could address or avoid touching upon perfectionist-, performance-, and social media culture
3. Digital Mental Health Tools could help users structure their time and energy
4. Digital Mental Health Tools could create a digital space (for relaxation)

These design implications are generalized and can to a smaller or larger degree be applied to a variety of solutions and studies. However, they do not directly answer how user engagement can be retained, and how human-centered design can improve the effectiveness of digital solutions. For these reasons, this study seeks to explore how mental health applications integrate into users' daily lives and how users engage and use such applications. Moreover, we aim to answer in which ways the design implications, management of daily tasks, and placing a focus on self-care can aid young adults with mental health challenges.

3 Methods

In this section, we explain why we created a mental health application, how it was built, and what ideas influenced its design. We also describe how we tested the application with users over the course of a week to evaluate its role in their everyday routines.

3.1 Mindly - A Mental Health Application

For this project, we were interested in investigating how users interact with mental health tools, and how prior research and our design implications would impact engagement and user satisfaction. Developing our own prototype instead of using a premade solution offered several advantages:

- Access and analyze user submitted data.
- Track user usage patterns such as login frequency, times of use, and activity completion rates.
- Integrate our design implications and research findings into a custom-built application.
- Avoid limitations or confounding features of existing mental health applications.

As a result, we developed Mindly, a mental health application designed to promote self-care and mindfulness by encouraging structure in users' daily lives through a gamified interface and an anthropomorphized companion.

3.1.1 The Interaction of Mindly

Mindly invites users to log activities they wish to complete in their daily life. Upon marking an activity as completed, users can earn experience points (XP), which contribute to leveling up. Each level unlocks a virtual reward for the companion's room, which allows users to choose one of two furniture color variants. The main scene, displaying daily activities, the XP bar, and the isometric room, is shown in Figure 1. Figure 2 displays the complete list of activities, from which the user can edit, delete, or add new activities. Additionally, users can also create daily reflections about their mood and what has affected their day, see Appendix A. These reflections are then shown in a calendar view, as illustrated in Figure 3. Absence from the application for 24 hours or more, causes the companion's plant to wilt, and it can be watered to return it to a healthy state.

3.1.2 The Development of Mindly

The conceptual development of Mindly was guided by wireframes that defined the application's navigation and core interface elements. These wireframes served as a blueprint for the implementation of the prototype.

The high-fidelity prototype was developed using the Godot 4 engine, a free and open-source game engine, capable of exporting to multiple platforms and allowing for 2D and 3D games [46]. We implemented application logic using Godot's own programming language, GDScript, as it was necessary for exporting to certain platforms. After initial testing, we finalized Mindly as an Android application.

To manage participant data, including logins, activities, reflections, and levels, we used Firebase, which is a Backend-as-a-Service platform. Firebase provided the database and authentication services, which enabled core features such as user login and data management without the need for a dedicated backend [15].

3.1.3 Theory Behind Mindly

As previously mentioned, our goal was to integrate prior knowledge about mental health support tools into Mindly. Our intention was to create a design tailored to young adults, because we wanted to explore how such a tool might sustain user engagement and enjoyment.

Among the prior gained knowledge was information attained through our interviews with the psychologist and student chaplain [19], both of whom emphasized the importance of work-life balance and taking mindful breaks. One tool mentioned was the 10 H's, a pedagogical exercise that encourages users to reflect on questions such as: *What is the task? When should we do the task? Why should we do it?* [26] This mindset is reflected in the activity creation process in Mindly. See Appendix A, Figure 4a.

Another insight we aimed to foster was parasocial feelings, which can enhance motivation [13]. To achieve this, we combined interactive gamification elements with a thoughtfully chosen visual style, developing Mindly as a 2D isometric game. This approach had several benefits:

1. Since the companion receives new furniture as the user progresses, the isometric layout provides an ideal perspective, showcasing the evolving space while maintaining a clear view of the companion's face. The visual consistency helps foster sympathy, anthropomorphic perception [9], and parasocial feelings, as users begin to relate to the companion as a lifelike presence within the application [50].

2. Additionally, we chose a simple art style that evokes a sense of nostalgia [35]. The visual style is reminiscent of games like Facebook's Pet Society [10], Nintendo's Animal Crossing [29], and Bandai's Tamagotchi [4], as well as other childhood toys. We believed this aesthetic would not only be cozy and cute, but also feel familiar, comforting and reinforce emotional attachment to the companion [40].

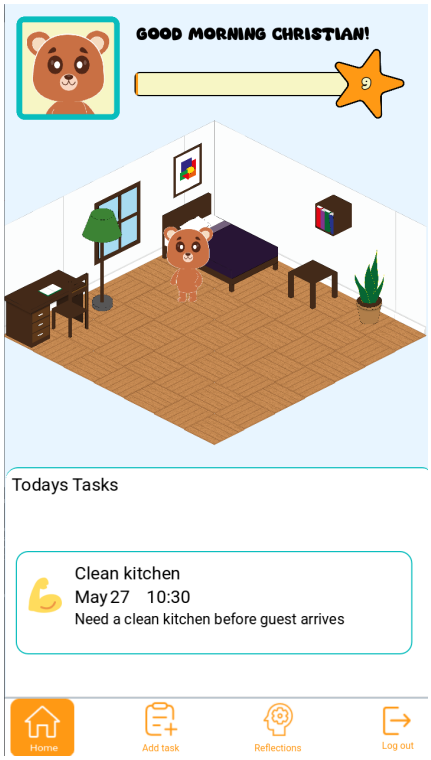

Figure 1: Main Scene

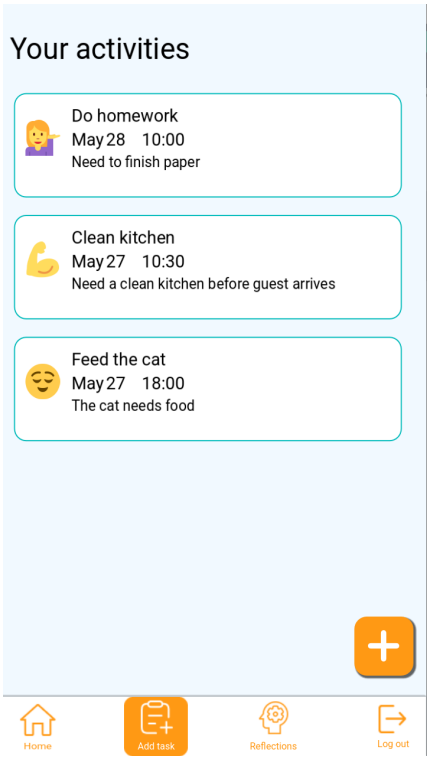

Figure 2: Activity Overlook

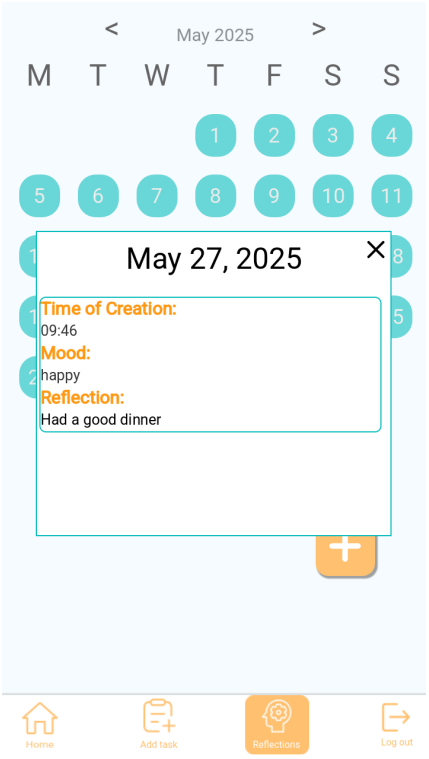

Figure 3: View Reflections

Furthermore, to enhance the companion's perceived liveliness and mirror users' own productivity, we incorporated animations such as moving around the room or sitting at a desk. Visual storytelling elements, such as unpacking boxes that gradually disappear as new furniture is added, further reinforce the narrative of building a new home together, which creates a metaphor for personal growth [36].

Lastly, as previously mentioned, Mindly uses the concept of gamification to encourage user engagement [7]. For this, we settled on the acquisition of XP, which are relevant to fill a progress bar and to reach level milestones, which reward the user with digital furniture. As the user progresses, the progress bar will take longer time to fill, thereby increasing the challenge level. Gamification is also used as a way to tell a narrative story, in which the avatar is an important actor. This narrative is about new starts. One the user and the companion take together, as they move into the companion's room, where completion of practical activities by the user will gradually turn the room into a virtual home.

3.1.4 Design Implications in Mindly

In our previous study [19], we defined four design implications for mental health tools. We wanted to integrate each of these into Mindly, to ensure that the application would be well-aligned with mental health practices:

1. **Digital Mental Health Tools could be flexible and adaptable to the needs and preferences of users.**

   This design implication is reflected in several aspects of Mindly. Most importantly, we aimed to give users the freedom to use the app in a way that suited their individual needs. Activities and reflection creation is entirely user-

driven, where they decide how many to create, when to complete them, and what to include in each entry. In addition, the visual and aesthetic customization option when upgrading the companion's room supports a sense of personal expression. These choices result in a unique experience for each user, with furniture unlocking at different times depending on their level of engagement and personal journey.

2. **Digital Mental Health Tools could address or avoid touching upon perfectionist-, performance-, and social media culture.**

   The second design implication is primarily addressed by steering away from data-centric metrics. Instead of pressuring users with performance tracking, Mindly focuses on positive reinforcement, rewarding engagement through user-submitted data without penalizing inactivity. As such, we intentionally left out features like streaks, push notifications, daily completion rates, and comparative metrics such as displaying level or XP across users.

   The one exception is the wilting plant, which serves as a subtle nudge to re-engage. Its purpose is to explore how users respond to gentle reminders and if these trigger feelings of guilt or failure.

   This design implication is also supported indirectly through Mindly's emphasis on mindfulness. Both the reflection and activities systems encourage self-awareness and personal value-based motivation, thereby helping to combat unrealistic expectations and external pressures, which are often reinforced by performance-driven digital environments [5].

3. **Digital Mental Health Tools could help users structure their time and energy.**

   The third design implication is implemented in several ways. Most notably through the use of the 10 H's framework [26], which inspired the activity creation process. Mindly includes a activity list and a reflection calendar that aims to provide users with a clearer overview of their schedules.

   The activity list allows users to assign activities to specific days and time slots, helping them visualize their commitments and better manage their time. This not only highlights periods of high activity but also encourages users to consider how they are spending their time. Activity creation is designed to support a variety of self-care practices aligned with the five primary structures, and further promotes balance and intention [23].

   Meanwhile, the reflection calendar offers users an opportunity to pause and evaluate their emotional state. Writing reflections, either during or at the end of the day, encourages mindfulness. Over time, the calendar may help users identify patterns in their mood and energy levels, offering insights into what influences their emotional well-being [5].

4. **Digital Mental Health Tools could create a digital space (for relaxation).**

   The fourth and final design implication is addressed through multiple features in Mindly. First, the application offers a calming digital environment where users can manage their day using a journal that functions as a to-do list, calendar, self-care facilitator, and mood tracker all in one.

   Second, the application uses empathetic and non-judgmental language to foster a sense of safety and emotional support, encouraging users to engage without pressure [37]. Finally, the inclusion of a gamified companion and a customized digital room provides a comforting space that users can return to. This space serves not just as a productivity tool, but as a place for emotional reflection, where users can

process their thoughts and feelings in a relaxed, non-judgmental, and supportive setting [25].

3.2 Evaluation of the Prototype

Having built and refined Mindly, we conducted week-long user studies with five participants within our target group. This approach was inspired by Kjeldskov and Skov who encourage field studies [21]. We intentionally recruited participants who represented different situations, including students balancing studies and work, individuals employed under flexible work arrangements, and full-time employees. By selecting participants across diverse contexts, we aimed to capture nuanced insights into how different daily routines, responsibilities, and prior experiences with similar digital tools might influence their interaction with Mindly. This approach allowed us to evaluate the application's adaptability, effectiveness, and appeal across a broad range of user needs and lifestyles. Details about the participants can be seen in Table 1. The one week duration was chosen based on the assumption that if users would not significantly engage with the application within the first week, they would be unlikely to adopt it in the long term. Additionally, a week was considered sufficient to observe usage patterns and gather feedback on how the tool fit into their daily lives.

The evaluation began with semi-structured interviews to understand each of the participants' daily routines. After installing Mindly on their smartphones, participants received a brief introduction and were encouraged to use the application in a way that suited their preferences. At the end of the week, debrief interviews were conducted to assess their experiences.

3.3 Data Analysis

To analyze our data, we first reviewed Mindly's database and recorded all relevant usage details for each participant, such as login frequency and number of activities completed. Next, we applied open coding to the pre- and post-interviews by labeling statements, thoughts and ideas such as their impressions of specific features or mentions of obstacles to regular use. These codes were then organized through a thematic analysis [43] into broader themes, in order to gain overview of common challenges in their everyday lives and what would keep them from using a mental health tool. The results from the analysis can be seen in Section 4.

By combining a detailed examination of in-application behavior with a thematic analysis of the interviews, we gained a deeper understanding of how users experienced and interacted with Mindly.

Together, these development choices and evaluation methods aimed to explore how a gamified, personalized virtual companion could support young adults in cultivating self-care habits and emotional insights. These findings are presented in the following section.

4 Findings

This section presents the five overarching categories in which we have divided our findings from our evaluation of Mindly, based on both the pre- and post-interviews, as well as the data from Firebase. The findings are further supported by quotes, which have been translated from Danish to English to ensure readability and clarity.

4.1 Patterns of Usage

Insights from the analysis highlight the varied ways participants engaged with Mindly and showed how applications like Mindly support different preferences. This can be seen in various data, including how frequently the application was used and what type of activities users created. These data points can be viewed in Table 2.

Although the database provided us with insights into usage patterns, we also relied on participant

Table 1: Overview of test participants, their gender, current work/school situation and experience with similar tools

Participant	Gender	Situation	Experience with similar tools
A	Female	Off work sick due to stress	Mood tracker
B	Female	Flex-Job (Employment for people with reduced work capacity with partial government support)	Finch (3 year long streak)
C	Female	University Student	Has tried a diverse selection of structure and mental health tools
D	Male	University Student & Freelancer	Pomodoro Timer
E	Male	Full-time Job	No prior experience

interviews to contextualize these patterns. Several participants explained that they used Mindly at specific times of day, most commonly in the mornings, late afternoons, and evenings. This aligns with typical daily routines, where users planned their day in the morning, checked progress in the afternoon, and reviewed completed activities in the evening. For instance, Participant E noted: *"I used it in the evening to review my progress, but also throughout the day to check off activities."*

The average number of logins per day was 2.8 across participants. However, as Table 2 shows, the depth of engagement varied. Participant B, for example, was highly active, creating and completing far more activities than other participants. She used Mindly as an integrated part of her routine, applying it to *"practical things, personal things, and social stuff."* It is however important to note that her prior experience, and long-term use of Finch might have influenced this super-user type of approach. In contrast, Participant C used Mindly less frequently, primarily for occasional or non-routine reminders. When prompted all participants explained that they were satisfied with their degree of usage, despite the varying creation and completion rates. We can tell from the data, however, that each participant mostly fulfilled their self-set goals.

These similarities and differences point to how each participant interpreted Mindly based on their personal needs and prior experiences. Importantly, some participants also reported that using Mindly changed their perception of time and planning. Participant C, for example, described shifting from focusing on how long activities objectively took to how they felt *"I started to use time as how long time it feels it take, instead of how long it actually takes."* She began structuring her day around perceived effort and mental load, rather than strictly measured time, suggesting a more intuitive and compassionate approach to scheduling.

4.2 Structure in Daily Life

As previous mentioned participants reported satisfaction with using Mindly, stating that the structure provided by the application had a positive impact

Table 2: Average of daily use for each participant

Participant	Level Reached (Total)	Times logged in	Activities Created	Activities Completed
A	5	2,4	1,4	1,4
B	8	4,3	13,7	11,3
C	5	2,1	1,4	1,1
D	3	2,1	1,4	1,4
E	3	3,1	3,4	2,3

on their day.

Prior to the test period, participants reported a recurring challenge of maintaining a healthy work-life balance. Participant E said, *"I'm fan of taking time off when I have time off"* but later elaborated, *"I have a work-PC, and sometimes I feel tempted to check e-mails even though I am off work."* This illustrates how the boundaries between work and personal time can blur, especially in home settings, making it harder to relax. Participant C expressed similar difficulties separating academic responsibilities from personal time: *"I don't feel like I really have a balance between when I am doing university work and when I am not. I am not good at separating them. Often, if I have been stressed one day, I can first relax the day after."* She added, *"I have a tendency to overwork myself, and when the stress gets too much I tend to do nothing, but I can't relax either."* These reflections reveal a shared experience among participants: a persistent sense of guilt associated with both action and inaction. Participant A, who was on sick leave during the study, felt overwhelmed by simple household activities, yet also guilty when resting. Participant D expressed a similar struggle, saying, *"I get a bad conscience when I don't exercise."* Together, these reflections suggest that many participants felt trapped in a cycle of pressure, whether it was being productive or taking a break, driven by internalized expectations and self-imposed goals.

Mindly helped address these issues by providing structure throughout the day. For example, Participant D explained: *"I was motivated by the overview of the day, because I discovered where I had time to do other activities."* Other participants reported similar experiences. Participant C, who had mentioned in the pre-interview that she struggled with breaking activities into manageable parts, later shared, *"It has helped me plan my day, and to discover if it is realistic, so I kind of used it instead of a calendar."* Participant A similarly noted, *"It has given me more structure and I make a routine for myself"*, suggesting a positive shift in daily organization. For Participant E, this translated into more time spent on hobbies, something he had hoped for in the pre-interview. Reflecting on the week, he said, *"I have done things I normally would not have done."*

4.3 Establishing a Parasocial Relationship

Findings suggest that Mindly had a satisfactory degree of elements for the participants to establish a relationship with the companion, but that there was an interest in more interaction that would potentially deepen the parasocial bond.

When the prototype was introduced to the partic-

ipants, they expressed positive feedback about the companion's looks. This was highlighted again after the test period, especially by Participant C who claimed she liked watching it walk around, and test Participants A and B, who called it *"cute"*. B elaborated that it had a toy-like quality which she liked, *"It looks an old school teddy bear."* The visuals of the companion and the gamified system had an impact on the way the participants came to view the companion. For example, Participant C mentioned, *"I enjoyed that the companion unpacked its room."* While Participant E expressed a bit of confusion about the order of furniture. *"I am a bit confused why you received the bed so late."* Thereby describing that the story would have worked better had the companion started unpacking with larger furniture pieces, although he later compared his own moving experience to it. *"Although I suppose I also started with a plant and a bookshelf, when I moved."* These findings indicate that the companion's looks and the narrative that is built around the gamified elements are important to participants' experience and connection to the companion. This was particularly noticeable when Participant A expressed an established relationship with the companion, as she stated that she felt less alone in doing the activities. *"I liked putting in my activities, it was like a little game, and it made me feel like I wasn't totally alone in doing them, it made it all more fun in a way."* This corresponds with prior knowledge that caretaking and community ease the labor of activities and motivate individuals to engage with them.

Participant B liked that the companion could write at their desk, and was interested in seeing it doing a variety of other activities, *"It could maybe sleep, or read a book since you have a bookshelf in the room."* She also expressed a desire that clicking on a specific furniture could prompt the companion to do the corresponding animation, *"So when I click on the desk it sits at it and writes"*, in that way they could mirror each other, when she was doing a similar activity. Participant E expressed a similar desire, asking for more interaction with the companion *"It could be fun if you could interact with the pet and it could maybe ask about your day"*. These findings suggest a relationship with the companion, and a desire to deepen that bond through more interaction.

Participants A, B, D, and E, expressed a desire for more customization and personalization. As Participant B said: *"I love clutter and decorating and stuff like that, so I would love to do it here."* Suggestions included the option to move furniture, change the companion's fur color, choose between different styles of the same furniture item, to expand the room into a house that could be customized, to be able to re-pick previous furniture choices, or customize the colors of the items, etc. These suggestions all tie into the desire for personalization and creating a unique space. This aligns with the concept of parasocial interaction, as the ability to customize their environment fosters a stronger emotional attachment to the application [1].

4.4 Engaging and Retaining Users

Overall, our findings identified that gamification served as a motivator to engage users, but could potentially also serve as a stressor. Furthermore, external life circumstances and accumulating backlogs could prevent the continuous use of Mindly.

Regarding the level system, Participant C said: *"If I have to do a activity I might as well get some XP for it"* and Participant D elaborated *"I am motivated by XP and the choices you could make [red. when leveling up]."* Furthermore, Participant A expressed *"I like to gamify my everyday life"*, suggesting that the reward of completing activities was enjoyable and motivating. Similarly, Participant B and C expressed interest in reaching all levels and unlocking the corresponding furniture. In the post-interviews they both mentioned the level they had reached, Participant C expressing disappointment, saying *"I only reached level 5"*, despite (unknowingly) being second highest in the overall level achieved by our test participants, as seen in Table 2. In this context we discussed the balance of gamification, whereto

participant C expressed *"Some apps are so simple they become irrelevant while others pace me to do even more, which I don't like."* The concern about gamified elements was also raised as we discussed the wilting plant with Participant C and B. Although they both found that *"watering the plant is a small easy thing"*, both also expressed concern about the plant potentially dying. Participant C said, *"I would be sad if it died or totally vanished."* This suggests that gamification was a motivator for participants to use Mindly, but that balance is a fine line, as gamified elements could also serve as stressors.

The importance of gamification was further exemplified by the reflections' page, in Mindly, as this feature went largely unused and unnoticed due to not rewarding xp. Participants B, D, and E all agreed that gaining XP for reflections would motivate them to create more, exemplified by Participant E *"I did not get the same feedback when I created reflections [...] if I gained XP for reflections I would use it more"*. Most of the participants believed this to be one of the main causes for not using the reflections feature, only some and only secondarily explaining that they do not believe this type of activity to add much benefit in itself. As Participant C explained *"reflections do not work for me"*. Another reason as mentioned by Participant A was that she had another application for writing her thoughts.

During the interviews the participants provided several possible factors that could cause them to stop using an application like Mindly. Participant D said *"If the activities become so routine that I just have them in my head."* Similarly, Participant A indicated that increased busyness could reduce her use of the application. These are factors outside the application's control, but suggest that changes in daily life could affect the continuous use of mental health tools. When asked the same question, Participants B and E expressed that a persistent backlog could contribute to feelings of stress. Highlighting a preference for uncompleted activities to disappear. This suggests that, potentially, a mental health tool could contribute to the problem instead of relieving it, depending on implementation. Although other Participants expressed that they liked the backlog as it became a calendar and to-do list, as Participant C explained: *"When I put a activity into Mindly I didn't have to think further about it. Sometimes I would change the date of the activity to continue having it up on my main page..."* This highlights a juxtaposition in opinions based around a persistent backlog. When posed with the question of possible reasons to stop using mental health tools, Participant B mentioned that she would not stop using a mental health application as she is *"more productive, remembers smaller activities, and takes care of herself"*, and elaborated, *"self-care is a lifelong journey."*

Regarding notifications and streaks, participants expressed differing opinions. Participant B was strongly against notifications and streaks *"I hate push notifications and I don't care about streaks"*, while Participants E and A would like them, as A said *"I would like a reminder as I experienced writing things down, that I wanted to do in 15 minutes and suddenly three hours had past."* While participant D would like to toggle the notification on and off, so he could get them when he wanted. Participant C felt ambivalent, as it depended on what mood she was in when she received the notification.

4.5 Advice for Mental Health Applications

The overall reception of Mindly among the participants was positive, however, they did have some improvements. These include increased application speed, modifications to self-care categories, and refinements to the reflections feature. The findings can guide similar and future mental health applications, particularly in how they encourage reflection, structure categorization, and maintain simplicity of features.

When asked what changes participants would like

for Mindly, only Participant B mentioned optimization and speed, alongside a few bugs, she explained that those were the main things holding her back from using the application *"If you fixed those things, I'd drop Finch in a heartbeat."* Satisfaction of Mindly was also clear as both Participant A and C asked if they were allowed to continue using Mindly after the test period, substantiating that these problems could be ignored for the enjoyment of using Mindly.

For activities creation, Participant C and B both mentioned liking the description section, Participant C stating *"It can be very obvious, but just saying I want to wash clothes to have clean clothes, made it better."* She did however, mention confusion of the categories (based upon the five self-care structures) currently available, *"If I have to call someone that is a physical activity, but it is also mentally taxing."* Likewise, Participant B said: *"If I draw is that leisure or spiritual?"*, but she expressed that she otherwise liked the categories, based on the self-care practices mentioned in Section 2 and advised an additional category, namely "personal upkeep," in which she suggested activities like brushing your teeth. This suggests that the five categories of self-care practices are not substantial in themselves, but that categorizing and adding descriptions of activities was a well-received feature, as it encouraged further reflections. This was further exemplified by a desire for a wider range of emojicons for activity creation, and the possibility to group activities, *"In Finch I have a group called morning rituals, and they're all neatly tucked in there."*

As for reflections, Participant A mentioned that she already had a mood tracking application. She went on to explain that it prompts her every evening at nine, and suggested Mindly do something similar. Participant C suggested that prompts could appear after activity completion, but went on to explain that she'd rather have an overview of her completed activities than a reflection. Likewise, Participant D discussed that he equally liked and disliked the reflection feature. However, like Participant A and B, he believed that a better overview, e.g. colors for each day, would have an impact on his usage of the feature, as it would give a clearer overview and thereby serve as a motivator similar to [44]. These considerations point to several ways to better integrate and encourage the use of certain features. However, the statements also point to a desire for single purpose use. Another example of such a desire is exemplified when Participant D was asked whether we should introduce a feature similar to Pomodoro Timer into Mindly. Towards this, he expressed dissatisfaction, *"No, I feel like it works fine as it is right now..."*, highlighting a desire for simple mental health tools, that have singular or few features and purposes.

4.6 Summary of Findings

Through our analysis of the user studies and interviews, we have identified five overarching categories: *Patterns of Usage, Structure in Daily Life, Establishing a Parasocial Relationship, Engaging and Retaining Users, and Advice for Mental Health Applications.* These categories illustrate how Mindly integrates into users' daily routines, fosters a sense of companionship, and highlights both well-received features and areas for further refinement, which may guide similar mental health applications.

The first finding concerns usage patterns, namely that the participants tended to use Mindly primarily in the mornings, late afternoons, and evenings. Across these different habits, Mindly helped participants manage their activities and plan their time in ways that aligned with their personal preferences. In particular, Mindly's structured approach appeared to support both day-to-day productivity and a more stress-reducing approach to planning, which eased some of the pressure participants felt to meet (self-imposed) expectations and encouraged regular self-care practices.

Another motivator for participant engagement was Mindly's companion and leveling system. Our find-

ings suggested that Mindly had a satisfactory degree of elements for the participants to establish a relationship with the companion, although they pointed to a desire for more customization and interaction. Indicating that richer interaction could further strengthen the attachment between users and the companion. Our findings further highlight the importance of implementing the right amount of gamification. Too few gamified elements can make the application feel uninspiring and decrease motivation, while too many game mechanics, an example of such being streaks, risk adding stress rather than alleviating it. In Mindly's case, participants appreciated the gentle rewards of the leveling system, but they also cautioned that if the game elements were dialed up too far, the application could become another source of anxiety rather than a tool for self-care.

Finally, our findings suggest that effective mental health tools tend to excel when focused on a single, well-defined purpose.

5 Discussion

This study set out to explore how mental health applications integrate into young adults' daily lives and how users engage in such applications. Moreover, we aimed to examine the relevance of the design implications by implementing them into an application. For these purposes, we created Mindly, a gamified mental health application with a virtual companion, designed to support young adults with mild mental health challenges through structure and self-care routines. The user studies involved providing Mindly to five participants and encouraging them to use the application freely in their daily routines for one week. Finally, we sought to answer literary gaps such as; How users engaged and desired to interact with a mental health application, how gamification and parasocial relationships applied to and affected engagement, and how our previously proposed design implications could be integrated into a mental health tool [3, 12, 22, 19].

Our findings from our study showed that participants generally reacted positively to Mindly's combination of a virtual companion and game-like rewards. Many participants said the application motivated them to plan and complete daily activities, and they appreciated that it felt supportive. Although the usage patterns varied from participant to participant, Mindly's structure helped them organize activities in a way that fit their personal needs. By combining productivity support with a nonjudgmental design, Mindly reduced participants' self-imposed pressure to meet unrealistic expectations and made it easier for them to maintain regular self-care. Furthermore, we found that the participants were motivated not solely by the positive changes in their day-to-day life, but that both gamification and parasocial feelings had a role in such. However, we became increasingly aware that too much gamification can be discouraging rather than motivating. These findings overall suggest ways to engage and retain users, highlight potential pitfalls in the design of similar applications, and suggest potential approaches to further delve into the feelings and design of tools that can apply or play into the way we feel towards and around daily activities.

5.1 Discussion of Design Implications

In this section, we return to the design implications made during our pre-specialization [19] and rediscuss these with new considerations and the findings we have gathered from this study.

5.1.1 Digital Mental Health Tools could be flexible and adaptable to the needs and preferences of users

This design implication indicates a desire and need for users to customize and personalize a mental health tool, as to fit personal use and preferences. Throughout this study we have gained a deeper understanding of the design implication; Participants

appreciated the ability to make choices regarding the decoration of their room, but would like more personalization options for visual elements. This finding also aligns with research conducted by Alimany and Kuhail, who investigated how perceived authenticity and personalization of intelligent virtual assistants (IVAs), influence user trust, commitment, and intentions to continue using these technologies [1]. They discovered that authentic and personalized interactions with IVAs lead to higher user engagement and trust. This indicates that a customized experience enhances the parasocial relationship, thereby motivating users. Furthermore, we also argue that the simplicity of Mindly made it flexible and adaptable to the users, as there is no correct or wrong way to use it, exemplified by different usage patterns across participants. Verkijika also argues that simplicity is an important factor for application development, as it enhances user satisfaction [49]. Our findings, in conjunction with prior research, indicate that visual personalization and design simplicity are critical factors in enhancing user experience and should be prioritized in mental health application development.

5.1.2 Digital Mental Health Tools could address or avoid touching upon perfectionist-, performance-, and social media culture.

This design implication emphasizes the avoidance of data-driven metrics and encourages authentic self-presentation to avoid comparisons between users, thereby shifting away from a performance-driven culture. Reflecting on this design implication, we observed how even subtle progress indicators in Mindly could prompt self-comparison. Although Mindly does not display public leaderboards or allow users to see each other's progress, some participants still compared their levels based on how far they imagined other participants had reached during the one-week evaluation. One participant expressed disappointment by *"only reaching level 5"*, revealing how easily performance pressures can surface when users view metrics as meaningful benchmarks. However, this may partly be because participants knew they were part of a study alongside others, whereas in a real-world deployment, such comparisons might be less significant. Similarly, Mogavi et al.'s findings indicate that Duolingo's streaks often become internalized markers of success or failure, leading to anxiety when users fear 'breaking' their streak [16]. From our observations, we can speculate that even the 'gentle reward system' of Mindly can trigger similar perfectionist impulses if the users believe their progress reflects personal worth.

Research on self-tracking suggest that collecting data about one's own behavior, may boost motivation by making progress visible. Yet this behavior can also feel like the tool is dictating users' actions rather than supporting them. In particular, fully automated metrics, which Barker-Canler et al. [5] term *"hard reflection"*, often fail to engage users in deeper meaning-making, whereas allowing people to enter their own observations more flexibly (*"soft reflection"*) foster greater ownership and insight. To counteract this, Mindly frames activity completion as a shared effort with the virtual companion, such as the users and companion 'watering the plant together' rather than racing to preserve a streak. By positioning XP and level within a collaborative narrative, Mindly avoids rigid streak mechanics. Regarding this design implication, we have discovered that mental health applications should focus on a collaborative narrative and gentle nudging of the users, avoiding a forced and competitive experience.

5.1.3 Digital Mental Health Tools could help users structure their time and energy

This design implication contributed to the importance of resource management. All participants felt advantaged by the structure Mindly created for them. This fits overall with William et. al's research regarding the importance of work-life balance

[51] and the statements from the psychologist and student chaplain during our previous research [19]. All three had stated that the balance of work and leisure had become blurred and had taken a toll on individuals. We found that Mindly became a tool for leisure and day-to-day activities. Some individuals focusing on self-care, others on daily chores, and others on non-regular activities, thereby using the application partially as a to-do list or calendar. Our findings also revealed that participants engaged in deeper reflection on their activities when using Mindly, facilitated by the description text and self-care categories. This observation aligns with the 10 H's framework [26], which fosters user reflection on the underlying purpose of activities. Research by Moeller points to the importance of reflective behavior as it was *"associated with improvement in emotional well-being and positive emotions* [27]. Researchers should take these findings into consideration as both the structural and reflective aspects have a positive impact on users' mental health.

5.1.4 Digital Mental Health Tools could create a digital space (for relaxation)

This design implication focuses on providing a calming, supportive environment where users can feel ease an unwind.

During this semester, gamification was implemented as a prominent motivator for engagement and retainment of users [17]. However, we were already aware of potential problems specifically surrounding relevance and appropriateness [8]. As our interviews later revealed, gamification can be aversive to some users, either being overwhelming or by feeling demanding, specifically through push notifications, streaks, or (self-set) expectations. We also noted that narrative and emotional consequences have a limit to the extend they can prod engagement from the users. This is best exemplified with the wilting plant implemented into Mindly, as several participants specified that they liked or didn't mind it wilting as long as it could be returned to a healthy state. They further discussed that death or removal of smaller objects would be emotionally taxing. Rentia and Karaceva had in their paper from 2022 set out to investigate what intrigued and inspired players to start and continue to play gacha games (games where players spend currency to obtain random virtual items) [34]. They discovered that narrative, visuals, and the feeling of owning a digital collection were strong motivators to the players. These elements are also reflected in our own findings, where participants showed positive feedback to the virtual companion, unpacking in a new home, and a desire to unlock all available furniture. Rentia and Karaceva goes on to discuss what demotivates players from engaging with gacha games and point to 'noise'. This refers to updates that diverged from the original story or narrative, and irrelevant features [34]. We are able to draw comparison between these findings and or own, as participants argued against the complexities of existing mental health tools and praised the simplicity of Mindly. Overall we can draw the conclusion that the relevance and complexities of gamification are important, but must also fit in accordance to context and application.

Geurts and Luyten found that anthropomorphic user interfaces could involve a variety of sub-properties, hereby including appearance, behavior, and personality, further identifying properties within these categories [14]. Although Mindly can be interpreted within these categories, the virtual companion was not designed around it. In particular the companion was not designed to properly have a personality, although a social role was considered when we constructed it. This could have been considered further, example Ye et al. discuss how digital pet appearance effects user perception of personality, they go on to highlight that users have a preference towards *"cats and dogs with neurotic personalities and cute appearances"* [53]

Creating a digital space for relaxation means balancing engaging elements with a clear purpose and

minimal 'noise'. By prioritizing simplicity and an emotionally supportive atmosphere a mental health tools can offer a positive experience to its users.

5.2 Comparison with Existing Mental Health Applications

In this paper we mentioned mental health tools such as Headspace [48], Daylio [44], Finch [45], and Habitica [47]. In regard to these, Mindly does share similarities and has drawn inspiration from these published applications. Specifically, Mindly shares activity creation with Daylio, Habitica, and Finch. Where Mindly rewards the user with XP when completing an activity, which gradually unlocks rewards, the other applications use some different approaches such as coins that can be spent on customization of a character or room [47] [45], achievements [44], an overview of daily and long-term stats [44], and time-gated progression which impacts the return of a companion from its adventure [45]. The mentioned applications all provide more metrics that potentially force users to engage with the applications to reach achievements, enhancing a focus on performance.

Mindly's activity creation is also different from the other user submitted goal applications, as it borrows concepts from the 10 H's [26]. This makes Mindly's activity creation concurrent with concepts of mindfulness and reflection when it comes to activity and time management, as well as efforts of self-care. In contrast, Finch suggests activities based upon categories and commonly created activities [45]. These are structured around emojis, the activity itself, date, and if the activity should be repeated.

Daylio and Finch both allow user reflection either through self-logged data, e.g. sleep patterns and mood-tracking [44], or through a variety of different prompts, such as: *"Gratitude Jar, What's one thing that makes your life easier?"* [45]. In this regard, Mindly's reflections are most reminiscent to Daylio's, although more simple as it does not log a variety of mood- and day affecting variables. This reduces user burden but limits the depth of insight available.

Mindly shares the commonality of an avatar with Habitica and Finch. Like Finch's companion, Mindly's is showcased on the main page and is given *"a life of its own"*, although unlike both applications, Mindly's customization is limited and without virtual currency, which limits options and completely avoids a shopping feature. In regards to storytelling, Finch's companion hatches and is raised by the user (comparable to a Tamagotchi), the companion has adventures and returns from these with collectibles, which the user can choose to interact with and reflect over. While Mindly tries to establish a less hierarchical relationship, you move in together, you both 'work' to make the space a better place, etc.

5.3 Limitations and Future Research

For the evaluation of Mindly five participants were involved. When selecting, we strove for a nuanced selection of participants, who fit within our designated age group, and who showed interest in mental health or mental health tools. Our considerations for diversity, despite these two criteria, therefore included gender, work, or situations regarding such, as well as experience with mindfulness and mental health tools. It is important to note that these inclusion criteria could have led to another group of participant, and subsequently different findings if a similar evaluation were to be conducted. However, we argue, that the diverse and nuanced group of participants do indicate data patterns that can be applied to a broader perspective. As the evaluation was a week-long user study, we have been unable to test how users will interact with Mindly for a longer period of time. Raising questions of whether they will continue using the application or possibly become super-users over time. However, the evaluation still provided meaningful data for understanding how a mental health application should be designed as well as how users approach and use such

a tool.

We encourage researchers to further investigate the role of gamification within mental health applications. Exploring how much gamification can be applied before users experience frustration and dissatisfaction. This balance should explore the line between simplicity, 'soft' nudging, and the point where gamified features become irrelevant or forceful.

6 Conclusion

This paper set out to answer the research question:

"How can a mental health application with a virtual companion support young adults, with mild mental health challenges, cultivate mental health routines and self-care practices?"

Through the development of Mindly, a gamified mental health application, we have been able to evaluate the interaction and approaches users have towards mental health tools. Through this knowledge, we have been able to re-contextualize our design implications from our pre-specialization [19] and have found that the activities created by users can vary from everyday activities to leisure, or non-regular activities. The structure of logging these activities provided users with an overview of their day-to-day life, made them engage in different activities they would not have pursued otherwise, and encouraged reflection regarding resource management, leading to increased mindfulness. Gamification and the parasocial relationship developed between users and Mindly's companion were key reasons for motivation and engagement, but these elements could be further explored in future research, as our participants believed that both insufficient and excessive gamification could reduce its effectiveness. We also found that the simplicity of the application lent itself to the varied approaches of users and made the application feel accessible to them. These insights contribute to the broader understanding of how mental health applications can support young adults with mild mental health challenges through engagement, structure of daily life, and personalization.

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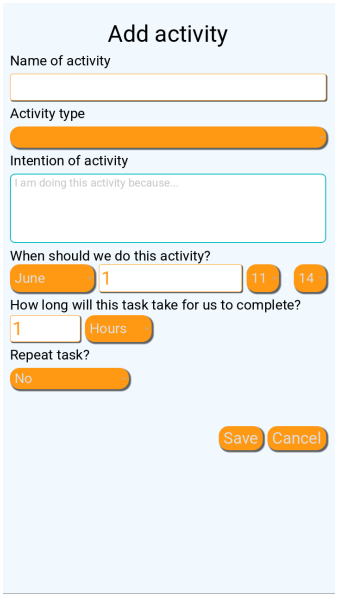
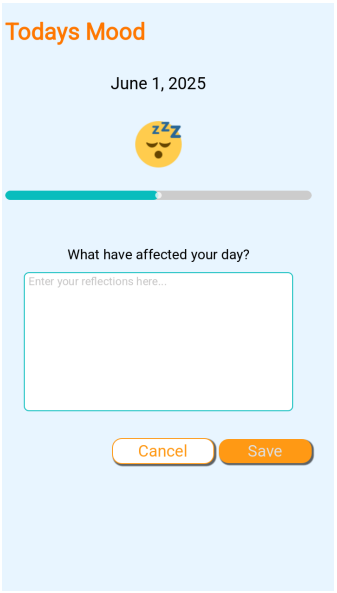
Appendix

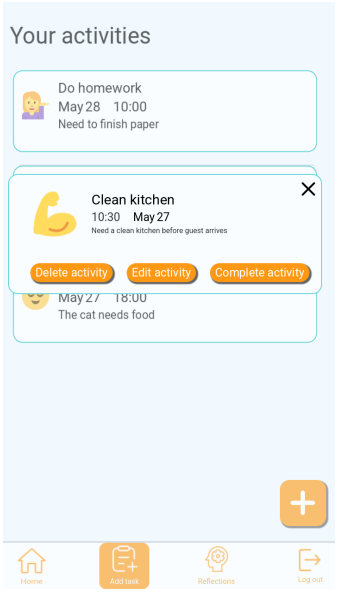
A Overview of Mindly



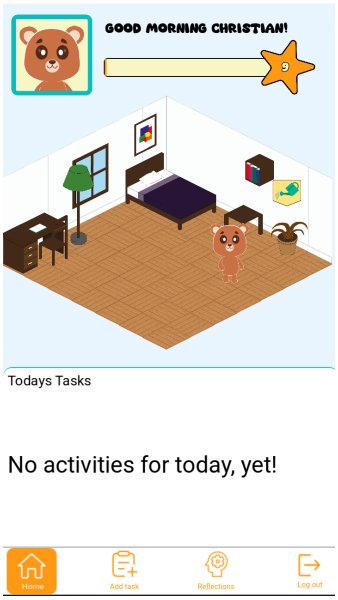
(a) Add Activity



(b) Add Reflection



(c) Task Pop up



(d) Wilted Plant

Figure 4: Overview of Mindly