

My Future in Focus: Exploration of Students' Perceptions and Experiences using the Prototype Future Me' - a Prospection-Based Chatbot 'Promoting Mental Well-being

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Abstract

Background: The growing demand for mental health support has led to exploration of digital interventions to bridge the gap between available resources and those seeking help. Large language models (LLMs) have emerged as a promising technology for creating more personalized and adaptive mental health chatbots. Prospection—the ability to envision and plan for future outcomes—represents a transdiagnostic process altered across various mental health conditions that could be effectively targeted through such interventions.

Objective: To investigate how people use "Future Me," an LLM-powered chatbot designed to facilitate future-oriented thinking, and what types of support they seek from it; to examine how Future Me enables future-oriented thinking; to assess its acceptability and usability across different user groups; to understand postgraduate students' specific perceptions and needs regarding chatbot-based stress management; and to identify how chatbot design can be improved to better address users' mental wellbeing needs.

Methods: Two complementary studies were conducted. Study 1 (n = 20) examined how postgraduate students used Future Me during a single guided session, followed by semi-structured interviews. Study 2 (n=14) investigated how postgraduate students interacted with Future Me over a one-week period, with interviews before and after usage. Both studies analyzed conversation transcripts and interview data using thematic analysis to understand usage patterns, perceived benefits, and limitations.

Results: Across both studies, participants primarily engaged with Future Me to discuss career/education goals, personal obstacles, and relationship concerns. Users valued the chatbot's ability to provide clarity around goal-setting, its non-judgmental nature, and its 24/7 accessibility. Future Me effectively facilitated self-reflection and offered new perspectives, particularly for broader future-oriented concerns. However, both studies revealed limitations in the chatbot's ability to provide personalized emotional support during high-stress situations, with participants noting that responses sometimes felt formulaic or lacked emotional depth. Postgraduate students specifically emphasized the need for greater context awareness during periods of academic stress.

Conclusions: Future Me demonstrates promise as an accessible tool for promoting prospection skills and supporting mental wellbeing through future-oriented thinking. However, effectiveness appears context-dependent, with prospection techniques more suitable for broader life decisions than acute stress situations. Future development should focus on creating more adaptive systems that can adjust their approach based on the user's emotional state and immediate needs. Rather than attempting to replicate human therapy entirely, chatbots like Future Me may be most effective when designed as complementary tools within broader support ecosystems, offering immediate guidance while facilitating connections to human support when needed.

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Keywords: Chatbot; Artificial Intelligence; Prospection; Mental Health; Student Wellbeing; Stress; Anxiety;

INTRODUCTION

The rising demand for mental health support has led to a significant gap between those seeking help and available resources. Approximately 11% of people in the United States seek psychotherapy annually. (1), with demand consistently outstripping supply. Additionally, postgraduate students face unique mental health challenges, including academic workload, financial insecurity, and social isolation, which can negatively impact their wellbeing (2,3). Digital interventions have emerged as accessible and effective early intervention/prevention techniques to address mental health problems, potentially reducing the burden on traditional services and providing support when human alternatives are unavailable.

Digital mental health interventions face significant challenges including low adherence rates (4), financial and logistical barriers to accessibility (5), and a lack of personalization. Many users disengage from digital tools due to generic, repetitive responses that fail to adapt to individual emotional states and stress levels (6,7). Addressing these challenges is crucial for developing effective, scalable mental health tools that align with users' needs, particularly for younger populations like students who may be more receptive to digital solutions.

Recent advancements in large language models (LLMs) have transformed the landscape of digital mental health interventions. Unlike earlier rule-based chatbots, LLM-based conversational agents can gather situation-specific information through natural conversation to provide personalized and context-specific interventions. These chatbots could improve equity and accessibility (8) by personalizing interventions, reminding users, tracking progress, and offering multilingual and adaptable communication options for users of diverse backgrounds and technology literacy.

Therapeutic chatbots have been utilized across a broad spectrum of mental health conditions, focusing on specific issues such as anxiety, depression, and autism (1). Most of these interventions position the chatbot as a different entity, like a digital therapist. However, LLM-powered chatbots may have the capability to enact more convincing alternative roles, offering novel therapeutic approaches beyond traditional digital therapy paradigms.

One promising application of LLM chatbots in mental health involves targeting prospection - a transdiagnostic cognitive process altered across various mental health conditions including depression, addiction, and schizophrenia (9). Prospection describes the ability to envision and plan for possible future outcomes, allowing individuals to adaptively integrate information from the past and present to simulate potential futures (10). When utilized appropriately, prospection enables goal pursuit, facilitates flexible decision-making, and contributes to maintaining a coherent sense of personal identity (11).

Research suggests that individuals with stronger identification with their future self tend to make better decisions in daily life, such as exercising more frequently (12), staying on the right side of the law (13), achieving better academic grades (14), experiencing greater wellbeing (15), and attaining superior financial outcomes (16). These benefits are understood as a consequence of the reduced difference between the future and present self, which results in improved inter-temporal decision-making - with individuals more likely to select "should" behaviours (e.g., exercising, saving money, going to bed early) over "want" behaviors (e.g., staying on the sofa, spending money, staying up late) (17).

Within the context of mental health, future-oriented therapies aim to promote goal-directed behavior (18). Therapeutic approaches have long recognized the significance of targeting prospection to improve wellbeing. Cognitive Behavioral Therapy (CBT) employs techniques that aim to readjust

clients' overly pessimistic predictions by addressing cognitive distortions like catastrophizing and fortune-telling (19) and incorporates Socratic questioning to help clients develop more accurate predictions about their future (20). Other prospective therapeutic practices with promising results include future-directed therapy (21), mental contrasting and implementation intentions (22), and goal-setting and planning techniques (23).

Utilizing an LLM chatbot may further facilitate these future-oriented approaches by enabling users to engage with their future self, developing the capacity for inter-temporal decision-making. These conversational agents may offer users support and guidance as and when they need it. However, due to the inherent opacity of LLMs, it is crucial to evaluate how they provide such support and, more significantly, how individuals interact with them.

While chatbots have been shown to provide valuable support through their 24/7 availability and non-judgmental nature (24), most research on mental health interventions has relied on retrospective self-reports, which may overlook moment-to-moment variations in stress levels and emotional states (25). Few studies have explored on-demand, chatbot-based interventions that incorporate prospection-based techniques, particularly for student populations who may benefit significantly from improved future-oriented thinking.

To address these gaps, we developed "Future Me," a chatbot prototype that utilizes GPT-3.5 to facilitate future-oriented thinking by simulating a conversation with the user's future self. This paper presents two complementary studies examining the usability, acceptability, and potential efficacy of Future Me:

Study 1 investigates how postgraduate participants use Future Me during a single guided session, followed by interviews to assess their experience.

Study 2 examines how postgraduate students interact with Future Me over a one-week period, with interviews before and after usage to understand expectations and experiences.

Together, these studies aim to answer the following research questions:

1. How do people use Future Me, and what types of support do they seek from it?
2. In what ways does Future Me enable or support the process of future-oriented thinking?
3. How are the acceptability and usability of Future Me perceived by different user groups?
4. What are the specific perceptions and needs of postgraduate students regarding chatbot-based support for stress management?
5. How can chatbot design be improved to better address users' mental wellbeing needs?

By exploring these questions, we aim to provide comprehensive insights into the potential of LLM-based chatbots for promoting prospection skills and supporting mental well-being and identify key design considerations for developing more effective digital mental health interventions.

METHODS

Design Overview

Both studies employed qualitative approaches to evaluate the usability and effectiveness of Future Me, a chatbot designed to facilitate future-oriented thinking. Study 1 focused on a single guided session, while Study 2 examined sustained usage over one week. Both studies utilized semi-structured interviews and analysed conversation transcripts between users and Future Me.

Participants

Study 1

Study 1 comprised of 20 postgraduate students (12 female, 6 male, 2 non-binary), aged 21-40 ($M = 25.1$, $SD = 4.39$). Study 2 comprised of 14 postgraduate students (3 men, 11 women) aged 22 to 33 years ($M=23.71$, $SD=2.73$).

Eligibility criteria included being over 18 years old, ability to read and understand English, being based in the UK, having a personal mobile phone, and not currently experiencing mental health problems.

The Future Me Prototype

Both studies utilized the same core Future Me chatbot prototype, which employed GPT-3.5 to facilitate future-oriented thinking based on principles of Mental Contrasting with Implementation Intentions. Mental contrasting involves imagining a future desired outcome and reflecting on present obstacles that impede its attainment. By making the connection between current reality and the desired future more explicit, individuals gain a deeper understanding of the challenges they may face and the feasibility of their goals.

Implementation intentions involve "if... then..." thinking, which promotes consideration of anticipated obstacles, planning to overcome these obstacles, and, consequently, more successful goal pursuit. Together, these therapeutic techniques have been shown to consistently aid goal attainment and promote a wide range of beneficial outcomes.

Future Me was also designed to use Socratic questioning, a key feature of CBT, involving a series of graded questions to guide thought toward a therapeutic goal strategically. The aim of bringing these therapeutic techniques together was to enable users to link their current behaviour and future consequences, facilitating skills in decision-making, goal-setting, and behavior change.

In both studies, participants interacted with Future Me by sending SMS messages to a registered phone number. Each message was stored on a local server, processed to create prompts for the GPT-3.5 model, and responses were sent back to the user's phone. The model employed an adaptive prompt creation mechanism, which refined the initial manual prompt as conversations progressed using each user's message history to 'train' subsequent responses.

Procedures

Study 1

The intervention involved a 15-minute interaction with Future Me via text messaging on their phone, in a quiet location chosen by the participants. Before involvement, participants were instructed that Future Me was designed to be open and self-directed, with the primary aim of facilitating thinking about the future and assisting in the exploration of prospective decisions, goals, and problems. To have relevant material for the conversation, participants were asked to come up with approximately three obstacles or decisions they were currently facing. Following the interaction, semi-structured interviews were conducted with participants via video conference to assess dimensions of usability, acceptability, and signs of preliminary efficacy.

Study 2

The study was conducted in three phases:

1. Pre-Interaction Interviews: Semi-structured interviews lasting about 45 minutes explored students' stress experiences, coping strategies, and expectations from digital mental health tools. Conducted online via video conference, participants discussed their stress management routines, daily stressors, PSS-10 responses, and attitudes toward digital mental health tools and chatbots.
2. Interaction with Future Me: After the first interviews, participants received instructions for using the Future Me chatbot. They were informed that the chatbot was not for crisis intervention and were provided with external support resources. Participants were asked to interact with Future Me over one week. After 7 days, they completed a second survey, including the PSS-10 and questions about their experiences with Future Me.

3. Follow-up Interviews: The final phase involved 25–30-minute follow-up interviews to assess the usability and effectiveness of the Future Me chatbot and explore changes in perceptions of digital mental health tools.

Participants in both studies received a nominal fee to reimburse them for their participation.

Measurements

Common Measures

Both studies employed semi-structured interviews to capture individuals' reactions to and experiences with Future Me. Interview questions were designed to assess dimensions of usability, acceptability, and preliminary efficacy. Additionally, both studies recorded and analyzed the conversation transcripts between participants and Future Me.

Study 2 Additional Measures

Perceived Stress Scale (PSS-10): Perceived stress was measured using the PSS-10, a widely used tool with high reliability. This 10-item scale assesses how often individuals have recently felt their lives were overwhelming, uncontrollable, and overloaded using a 5-point Likert scale. For this study, the timeframe was modified to measure stress over the past week rather than the past month, to correspond with the period participants interacted with Future Me.

Interaction Measurements: For each SMS message participants sent to the chatbot, the timestamp and message content were stored, along with the chatbot's response, allowing for analysis of usage patterns throughout the week.

Data Analysis

Conversation Analysis

In Study 1, conversations between participants and Future Me were analysed using framework analysis with NVivo (26). The thematic framework used to code participant inputs were based on the COM-B model for behaviour change (27), which identifies three key requirements needed for behaviour change: capabilities (C), opportunities (O), and motivations (M). The transtheoretical model of behaviour change was used to develop the framework for coding Future Me's responses, which posits that behaviour change occurs through stages: pre-contemplation, contemplation, preparation, action, maintenance, and termination (28).

In Study 2, a reflexive bottom-up thematic analysis was adopted to analysed conversation transcripts. The data were codified into key themes, which were then reviewed and consolidated into overarching themes. To ensure reliability, a second researcher independently reviewed the transcripts using a top-down analysis based on the initial codebook created by the first researcher.

Interview Analysis

In Study 1, interview transcripts were thematically analysed using the method outlined by Braun and Clarke (29). Coding was inductive, based on the frequency of particular sentiments across interviews.

In Study 2, a similar thematic analysis approach was used to assist in data coding and theme development. The interaction logs with Future Me were also analysed to examine the average number and timing of interactions, assessing whether patterns changed throughout the week.

Ethics

Both studies were approved by the research ethics committee of University College London (Ethics

approval IDs: CEHP/2024/597 (study 1) and UCLIC_2023_003_Dechant_Manning (study 2)).

RESULTS

Study 1

User Inputs

Analysis revealed that goals fell into three core categories: 'Career/education', 'Personal', and 'Relationships'. The 'Career/education' theme occupied more than half of user inputs, aligning well with the COM-B model, with most inputs falling into the capability component. This was divided into two separate codes to recognize that participants inquired about both their professional capability (e.g., skills, education, work experience) and their emotional capacity to reach these professional capacities.

The second largest theme was 'Personal', in which users expressed current obstacles in their lives and asked for advice to overcome these issues. Most inputs focused on internal factors, specifically psychological and behavioural aspects, falling under the 'Capability' category, followed by 'Motivation' and 'Combination', with only a few falling into 'Opportunity'.

Within 'Relationships', most inputs fell into the 'Motivation' category, in which individuals described relationship dynamics and nuance that informed their desire to commit to a behaviour change or decision. The remaining inputs were coded under 'Feasibility', which consisted of a combination of their capability and opportunity to action a behaviour related to a personal relationship.

The final theme, 'Anthropomorphizing', fell outside the COM-B framework and consisted of comments indicating the degree to which users were humanizing Future Me. Most frequently, participants used conversational markers and social cues similar to a typical human-human conversation (e.g., introducing themselves, saying thank you). The other codes in 'Anthropomorphizing' suggested that users were either keenly aware of Future Me being an AI and therefore did not use typical conversational cues ('expressionless tone') or directly questioned Future Me's capacity and limits ('curiosity').

Supplementary Table 1 summarizes the themes participants discussed during the usage of Future Me.

Future Me Outputs

The transtheoretical model was used to categorize Future Me's responses according to the presumed stage of change of the user. Responses were suggestive of users being in 2 out of the 6 stages - 'Contemplation' and 'Preparation'.

Under 'Contemplation', users identified a problem or goal and were evaluating whether and how to pursue it. Future Me primarily responded by 'Inquiring' about the context of their decision, 'Suggesting' information or techniques they could employ, and 'Evaluating' by highlighting relevant factors and nuances affecting a decision.

The second stage seen was 'Preparation', in which users had committed to a decision and were given action-based steps. There were significantly fewer outputs in this stage compared to 'Contemplation' (42 vs. 176).

'Recognition' was present in both stages and formed its own theme. In this theme, Future Me reflected information received back to the user through 'Acknowledgement' (neutral recognition or statement of understanding) and 'Positive reinforcement' (recognition with a hopeful and encouraging tone).

Supplementary Table 2 outlines the themes of the answers generated by Future Me collected during the conversations with the chat bot, and Supplementary Table 3 the themes of the answers generated by Future Me collected during the conversations with the chat bot.

Participant Interviews

Thematic analysis of the interviews revealed several key themes:

Initial Perceptions of Future Me

Participants had three main expectations before interacting with Future Me: 'Novelty of AI as a therapeutic tool', 'Interest' in testing AI capabilities or exploring personal issues, and 'Skepticism' that Future Me would provide generic or vague responses.

Topics of Conversation

Participants engaged in multidimensional conversations, combining practical and professional elements with personal preferences and motivations. Many discussed only professional goals, believing Future Me was best suited for objective and unemotional advice, and expressed skepticism about using it for personal matters due to perceived limitations of an AI not being human.

Positive Perceptions of Future Me

The main positive aspect mentioned was that Future Me provided 'Clarity and practicality' (85%), helping with idea mapping, exploring options, and evaluating pros and cons. Participants also valued how Future Me facilitated personal reflection by asking questions rather than providing answers (80%), finding it "unbiased" and "non-judgmental."

Additionally, 70% reported that Future Me provided new information and perspectives, particularly about career paths and techniques for personal issues. Participants found Future Me 'Reaffirming and consolidating' (65%) prior knowledge regarding personal obstacles, making them feel "reassured" and more "confident."

In 'Comparison to human conversation' (65%), participants described the interaction as "easy" and "natural," noting that Future Me exhibited features traditionally associated with being human, such as "emotional intelligence" and "empathy." The 'Text message format' (50%) was appreciated for its accessibility and comfort, making the conversation feel less formal and more human.

Negative Perceptions of Future Me

The main limitation mentioned was 'User-dependence' (70%), with users feeling they had to take responsibility for guiding the conversation. The main criticism (60%) was that Future Me provided 'formulaic' or overly general responses, though some acknowledged that advice from human sources can also be vague.

Half the participants thought Future Me was 'Lacking something human' (50%), finding answers less meaningful due to a lack of "compassion," "intention," or "empathy." Some participants (45%) felt uneasy about the 'Conversation flow,' particularly the fluctuating response time that disrupted normal conversation patterns, leading to feelings described as "disconcerting" and "frustrated."

Supplementary Table 4 and Table 5 outlines the positive and negative themes found in the user feedback collected after the interaction with Future Me

Study 2: Results

General Perceptions and Needs for Stress Management from Chatbots

Supplementary Table 6 outlines the themes from the pre intervention interview transcripts

Trust and Emotional Openness

While students found chatbots useful for immediate advice and practical support, they highlighted a lack of emotional depth as a significant limitation, particularly in high-stress situations. Participants expressed that, during moments of heightened stress, genuine compassion and nuanced emotional

support were critical qualities they felt chatbots could not provide, leading to a reluctance among some to rely on chatbots for deep emotional support.

Concerns over data privacy also influenced students' trust in chatbots, particularly regarding integration within university systems. Several participants expressed hesitation about the possibility of their conversations being accessed by university staff, fearing potential academic or professional implications.

Role and Effectiveness

The potential for chatbots to detect early signs of stress was viewed positively, with students noting that early warnings could help prevent stress from escalating. However, there was a widespread perception that chatbots lacked the emotional depth necessary for high-stress situations, leading to a reluctance among some students to use chatbots for emotional support.

Personalization and Contextual Awareness

Students expressed a need for chatbots to provide personalized support tailored to their specific academic stressors, envisioning chatbots having detailed background knowledge of their courses for more targeted advice. They highlighted the need for support appropriately tailored to their current stress levels, emphasizing that different situations require different responses.

Support Preferences

Students consistently valued the 24/7 accessibility of chatbots, highlighting the convenience of having support available at any time. Anonymity was also a significant factor, with many noting that it encouraged more openness in sharing experiences. The non-judgmental nature of chatbot interactions was cited as reducing the pressure to filter thoughts, making it easier to discuss sensitive topics.

Expressions of Stress and Support Sought from a Chatbot in Real-Time

Supplementary Table 7 outlines the themes of participants' inputs during conversations with Future Me.

Academic Stress and Time Management Advice

Postgraduate students, particularly those in their final term, experienced significant stress related to academic demands, with a strong focus on dissertation work. They sought practical, immediate relief through quick advice and activities, appreciating Future Me's swift SMS responses for short-term stress management.

Support to Tackle Negative Emotions and Low Motivation

Students reported emotional distress linked to academic workload and personal challenges. They found self-reflective questions useful for future uncertainties but frustrating when applied to immediate academic stress, as they felt these questions were time-consuming and added to their emotional burden.

Future Uncertainty and Advice on How to Handle It

International students expressed heightened stress about future uncertainties, particularly concerning finances, student loans, and job prospects before visa expiration. This theme was more pronounced among international students compared to their domestic peers.

Advice about Social Relationships

Although not as prominently discussed, social relationships were indirectly mentioned in the context of overall stress. The focus was primarily on academic and future-related concerns rather than

detailed issues with social relationships.

Future Me Engagement Metrics

Participants' interactions with Future Me were spread throughout the day, with 128 out of 214 chatbot interactions occurring between 9am and 5pm, and the remaining 86 occurring outside typical work hours.

A comparison of PSS scores before ($M=20.25$, $SD=5.96$) and after ($M=17.67$, $SD=6.51$) using Future Me for one week showed no significant difference, $t(11) = 1.765$, $p=0.105$.

User Engagement, Specific Perceptions, and Experiences of Using Chatbots for Stress Management

Supplementary Table 8 outlines the themes revealed from the follow-up interview transcripts.

Accessibility and Convenience

Postgraduate students found Future Me highly accessible and convenient, particularly outside working hours. They appreciated its personalized interactions and conversational tone, comparing the experience to speaking with a friend. Three students noted that simply expressing their current situations to Future Me sometimes helped relieve stress, similar to venting to friends.

Personalized and Relatable

Students valued the practical advice Future Me offered but felt there was a gap in its ability to provide empathetic support during high-stress times. They appreciated Future Me's reflective questions for broader issues like future uncertainty but preferred these questions focus more on understanding emotions during immediate concerns. When reflective questions were used during acute stress, students found the responses scripted and impersonal, leading to frustration.

Need for Better Balance Between Advice and Emotional Support

Several students found it difficult to express themselves clearly to Future Me during high-stress periods, noting that humans can often fill in blanks using body language and facial expressions. Students emphasized that they would be more open to using chatbots during high-stress periods if there were other ways to interpret their emotions, suggesting voice systems to make expression easier.

Increased Demand for Context Awareness

Students called for Future Me to be more context-aware and responsive to their immediate emotional states. They felt that integrating Future Me with professional mental health services could provide a more comprehensive support system, allowing the chatbot to assist with less serious issues while referring students to appropriate professionals for specialized support.

Connection with Human Support Systems

Students viewed Future Me as a valuable complement to human support rather than a replacement. They saw a need for integrating the chatbot with professional mental health services and believed it could help navigate the complexity of university services by referring them to appropriate professionals. While generally willing to share their chatbot data to streamline this process, they preferred those referrals be handled sensitively to avoid feeling dismissed.

DISCUSSION

Summary of Findings

Both studies provide valuable insights into how users interact with Future Me, a chatbot designed to

facilitate future-oriented thinking through simulated conversations with one's future self. While Study 1 focused on a single guided session with non-clinical adults, Study 2 examined sustained usage over one week among postgraduate students. These preliminary investigations point toward several promising directions for further development and research:

First, both studies demonstrate that users primarily engaged with Future Me to discuss career and education goals, personal obstacles, and to a lesser extent, social relationship concerns. The prevalence of career-related topics suggests that users find the chatbot particularly suitable for objective, goal-oriented discussions that benefit from structured future thinking. This aligns with findings from both studies and prior work (30) that participants viewed Future Me as less suitable for emotionally complex or high-stress situations that might require more nuanced human support.

Second, both studies revealed that Future Me effectively facilitated two key processes: guided introspective questioning and collaborative solution generation. Analysis of conversation transcripts in Study 1 showed that Future Me's responses primarily fell under the 'contemplation' stage of the transtheoretical model, helping users gather information, evaluate options, and move toward preparation for action. Similarly, Study 2 found that Future Me encouraged reflection and offered new perspectives, particularly valuable for addressing broader concerns like future uncertainty (31).

Third, users across both studies appreciated similar qualities in Future Me. Non-clinical participants in Study 1 and students in Study 2 both valued the chatbot's ability to provide clarity around goal setting (32), its non-judgmental nature, and its accessibility through text messaging (33,34). Both groups also found value in Future Me's ability to facilitate personal reflection without the influence of others' perspectives or judgment (35,36).

However, both studies also identified similar limitations. Participants in both samples noted that Future Me sometimes provided formulaic or generic responses that lacked personalization. Users in both studies felt that the chatbot lacked something inherently human, despite its ability to generate conversational responses. This was particularly evident during high-stress moments in Study 2, where students found reflective questions, although important for managing stress (37), frustrating when seeking immediate emotional support.

Implications for Design

Balancing Reflective and Directive Approaches

A key direction emerging from both studies is the need for chatbots to balance reflective questioning with more directive guidance based on the user's emotional state and immediate needs. While the Socratic questioning and prospective thinking techniques employed by chatbots, like Future Me, were generally well-received in prior work (38), our studies indicate that these approaches may be less effective during periods of acute stress or when users seek immediate practical advice.

Our findings strongly advocate for mental health chatbot designers to adopt a more adaptive and nuanced approach that considers both the user's emotional state and their surrounding context, including cultural factors (39). This perspective aligns with prior research demonstrating that the chatbot's communication style significantly influences user acceptance (40). Whenever a system detects signs of high stress or anxiety using through various techniques (41), the chatbot could temporarily shift from reflection-promoting questions to more direct, solution-focused responses that address immediate concerns. Once the acute stress has been acknowledged and addressed, the chatbot could then gradually reintroduce reflective elements to promote longer-term thinking and behaviour change.

Enhancing Personalization and Context Awareness

Both studies highlighted the importance of personalization in maintaining user engagement. Study 1 found that 70% of participants appreciated when Future Me provided new information specific to their situation, while Study 2 revealed that students wanted the chatbot to understand their academic context and tailor support accordingly.

Future iterations of mental health chatbots could substantially enhance personalization by implementing a layered approach to user understanding. By developing progressive profiling capabilities, these systems could build increasingly nuanced user models over time, remembering important details from previous conversations and creating a more continuous experience. This historical awareness would allow the chatbot to reference past concerns or achievements, creating a sense of ongoing relationships rather than disconnected interactions. Alongside this individual history, context integration would enable chatbots to recognize the broader circumstances affecting users' wellbeing. For instance, a system aware of university examination periods or job application deadlines could proactively adjust its support approach during these high-stress times, offering relevant coping strategies without users needing to explain their situation repeatedly.

Integration with Human Support Systems

Study 2 particularly emphasized the potential value of integrating chatbots within broader support systems. Participating students viewed Future Me as a complement to human support rather than a replacement, suggesting that mental health chatbots could serve as an initial point of contact that guides users toward appropriate professional services when needed.

This finding has important implications for institutional implementation of mental health chatbots, particularly within university settings. Rather than positioning chatbots as standalone solutions, designers should consider how these tools can form part of a comprehensive support ecosystem. This might include features that facilitate warm handoffs to human professionals, provide information about available resources, or offer continuous support between professional sessions.

Theoretical Implications

Prospection and Digital Mental Health Support

Both studies contribute to our understanding of how digital tools can facilitate prospection skills. The findings suggest that LLM-based chatbots can effectively support aspects of future-oriented thinking by helping users clarify goals, identify obstacles, and develop implementation intentions. This aligns with existing literature on the benefits of prospection for mental wellbeing and extends it by demonstrating the potential of AI-mediated conversations to strengthen future self-identification.

However, the studies also reveal nuances in how prospection techniques should be applied in digital interventions. While these approaches appear beneficial for addressing broader life decisions and goals, they may be less effective during moments of acute stress when immediate relief is the priority. This suggests that prospection-based digital interventions should be designed with sensitivity to timing and emotional context.

Anthropomorphism and Therapeutic Alliance

Both studies provide insights into how users anthropomorphize and form relationships with AI chatbots. Study 1 found that 65% of participants compared their interaction with Future Me to human conversation, noting qualities like "emotional intelligence" and "empathy." Similarly, Study 2 revealed that students compared talking to Future Me to speaking with a friend.

These findings suggest that users can form a type of therapeutic alliance with chatbots, even while remaining aware of their non-human nature. The non-judgmental quality of chatbot interactions appears particularly valuable, potentially reducing barriers to self-disclosure that might exist in human relationships. However, both studies also found that users perceived limitations in the emotional depth and authenticity of the chatbot, highlighting the complex nature of human-AI therapeutic relationships.

Limitations and Future Directions

Several limitations should be considered when interpreting the findings from these studies. First, both studies employed relatively small, non-representative samples, limiting the generalizability of findings. Study 1 used convenience sampling with non-clinical adults in the UK, while Study 2 focused specifically on postgraduate students, with international students overrepresented.

Second, the controlled research context may have influenced how participants engaged with Future Me. In both studies, participants were aware they were part of a research trial, which may have affected their privacy concerns and usage patterns. Future research should examine more naturalistic usage in non-research contexts to better understand how users would engage with the chatbot in everyday life.

Third, the timeframes in both studies were relatively short—a single session in Study 1 and one week in Study 2. While Study 2 provided valuable insights into sustained engagement, longer-term studies

are needed to understand how usage patterns evolve over time and whether benefits are maintained. Previous research has indicated that online mental health interventions often suffer from low retention rates, making longitudinal studies particularly important for evaluating practical utility. Future research should address these limitations while pursuing several promising avenues. Longer-term studies tracking users over 8-12 weeks would yield more comprehensive insights into engagement patterns, attrition rates, and the sustainability of benefits beyond initial interactions. Additionally, expanding testing to diverse populations, including those with clinical conditions and from varied demographic backgrounds, would enhance our understanding of how Future Me's benefits and usage patterns might differ across different contexts and user needs. The limitations of text-only communication, particularly during high-stress moments, could be addressed through multimodal interfaces making it not only easier to communicate with the device but also giving more data to detect signs of mental needs such as high-stress (42) or anxiety (43). Such approaches might better capture emotional nuances and reduce the burden on users when articulating complex feelings. Integration studies represent another crucial direction, examining how Future Me could function within existing mental health ecosystems to complement professional services and therapies, potentially serving as a bridge between self-help and clinical intervention. Finally, comparative effectiveness research directly measuring Future Me against other digital interventions and traditional therapeutic approaches would provide valuable insights into its unique contributions and limitations. Such comparisons would help situate Future Me within the broader landscape of mental health support tools and clarify its most appropriate applications and user groups. Together, these research directions would substantially advance our understanding of how LLM-based chatbots can effectively support mental wellbeing through prospection-focused interventions.

Conclusion

The two studies presented in this paper provide complementary insights into the potential of LLM-powered chatbots for promoting prospection skills and supporting mental wellbeing. Future Me demonstrates promise as an accessible, non-judgmental tool that can facilitate reflection, provide practical guidance, and help users connect their present actions to future outcomes. The findings suggest that such chatbots can fulfil a valuable supportive role, particularly when human alternatives are unavailable or when users prefer anonymous, pressure-free interaction.

However, the studies also highlight important limitations and design considerations. Future Me's effectiveness appears context-dependent, with prospection techniques more suitable for broader life decisions than acute stress situations. Users appreciated the chatbot's accessibility and reflective capabilities but noted limitations in emotional depth and personalization that affected sustained engagement.

These findings suggest that future development of mental health chatbots should focus on creating more adaptive, context-aware systems that can adjust their approach based on the user's emotional state and immediate needs. Rather than attempting to replicate human therapy entirely, chatbots like Future Me may be most effective when designed as complementary tools within broader support ecosystems, offering immediate, accessible reflection and guidance while facilitating connections to human support when needed.

As LLM technology continues to advance, the potential for chatbots to provide increasingly personalized and adaptive mental health support will likely grow. Future Me represents an important early exploration of how these technologies can be harnessed to promote prospection skills and support wellbeing, providing a foundation for continued research and development in this promising field.

Appendix

Table 1 Themes of the input phrases of users collected during the conversations with FutureMe

Theme (bold) /code	Description	N of inputs	Example (codes only)
Career or education	Users ask for advice about their career or education	103	
Emotional capability	Users express and/or question their emotional capacity to approach and accomplish work/education goals	23	<i>"How do I get over my fear of rejection when I apply to jobs."</i>
Professional capability	Users ask about how to increase their professional capability to achieve their goal or share their relevant background	22	<i>"How do you go about promoting your skills to a potential employee even if you are unsure about your ability."</i>
Opportunity	Users raise questions about specific actions they can take to reach their professional goal	30	<i>"What is the best city in Europe to pursue a bioscience PhD."</i>
Motivation	Users share motivations underlying decisions being made about career/education	28	<i>"I want to do something productive where it feels my intellect and time is valued. I want to make enough money to live comfortably."</i>
Personal	Users share personal problems or goals	48	
Capability	Factors affecting users' capability to pursue a goal, such as internal psychological and behavioural factors.	17	<i>"But I am worried about money. I want to have 4 kids but how will I be able to afford it."</i>
Opportunity	External factors affecting the users goals	3	<i>"What if I can't use a breathing technique, for example, because I am at work."</i>
Motivation	Internal factors that drive or inhibit action, such as internal conflicts	14	<i>"Ok, I am also struggling to decide between finding contentedness within the present or demanding more and pushing myself to achieve greater things."</i>
Combination	Users ask broad question about how to approach a personal goal, usually an opening question	14	<i>"How do I stop eating so many crisps."</i>
Relationship	Users present a relationship concern	13	
Feasibility	Users state concerns or ask about the feasibility of them taking action, combination of capability and opportunity	3	<i>"I don't know how to support my sister at the moment, she's going to have an operation soon."</i>
Motivation	Users present their motivations in the form of internal dialogue about a relationship concern	10	<i>"There's too much exchange of personal information. this only exists within the paid hr. I find it strange."</i>
Anthropomorphising	The degree to which users	35	

	humanise Future Me		
Conversational tone	Users interact with Future Me using a variety of typically human-human social conversation markers (e.g. introduce themselves, say please/thank you, acknowledge Future Me's help/advice)	24	"Ok, thank you. I will have a conversation."
Curiosity	Users ask Future Me about its ability or personal opinion	8	"What are the things that you can do"
Expressionless tone	Users not acknowledging Future Me, not using punctuation or put little effort into normal social cues that facilitate human-human conversation	3	"Yes ask me questions."

Table 2: Themes of the answers generated by Future Me collected during the conversations with the chat bot.

Theme (bold) /code	Description	N of inputs	Example (codes only)
Contemplation	Assists the user in the contemplation stage. Users are aware of the need to change and are evaluating it	176	
Enquiring	Enquires about the context of the user's obstacle or goal, including questions about previous steps taken and personal motivation	91	"What steps have you taken towards becoming a published writer so far?"
Evaluating	Guides the user through weighing up relevant factors for a decision	47	"The answer to this question is highly dependent on your location and lifestyle preferences"
Suggesting	Outlines various potential options, behaviours and/or decisions a user might want to take to pursue a goal or tackle a problem	48	If you're interested in meeting new people and potentially finding a romantic partner, travelling solo can be a great way to do so. Additionally, participating in group activities."
Preparation	Assists the user in the preparation stage. By this stage, users have committed to a decision and Future Me assists them by giving them lists of action steps	42	"Sure, here are some steps you can take to break the smoking habit: 1. Identify your reasons for quitting."
Recognition	Expresses a recognition of something stated by the user	58	
Acknowledgement	Acknowledges the user's emotional state, personal preferences and motivations	37	"It's natural to feel frustrated when expectations aren't met."
Positive reinforcement	Highlights a positive from what the user has shared with them or encourages the user	21	"It's great that you're taking initiative to improve the condition of your gym."

Table 3: Themes of the discussions between Future Me and the participants

Theme	Description	Frequency of presence	Example (codes only)
Initial reaction to Future Me			
Novelty of AI as a therapeutic tool	Mentions that Future Me is the first therapeutic chatbot that they have interacted with or that they have only interacted with chatbots in non-therapeutic contexts	100%	“Customer service chat like with your bank and things like that but no, I haven't had too much experience with them”
Interest	Mentions feeling interested, excited, curious or intrigued about interacting with Future Me	65%	“I'm just kind of interested in what they are capable of and how useful they could be”
Scepticism	Mentions feeling sceptical about Future Me's capabilities	45%	“I thought it would be somewhat of a trivial exercise if I'm being honest, because I know how these work, the large language models yield quite generic answers which are not, which just cannot be tailored because of the data set and so I just thought it would yield generic advice”
Topics of conversation			
Balancing personal and professional	Mentions that their conversation with Future Me combined elements of their professional and personal life	100%	“How can I overcome my personal insecurities, like personal things that I don't like about myself in order to make better decisions in the future and like psychological obstacles that I'm facing towards my career”
Professional life	Reports that their conversation with Future Me was about their work, such as career advice or helping to overcome work procrastination.	100%	“It gave me, like other suggestions for getting into quantitative finance, basic but really useful suggestions like highlight age analysis, get certificates, emphasise experience”
Personal life	Reports that their conversation with Future Me was about an obstacle in their personal life such as their health or relationships.	80%	“It gave me good ideas about the weed, like identifying your reasons for quitting, like ok, maybe I should do that and like set a quit date.”

Table 4: Positive themes found in the user feedback collected after the interaction with Future Me

Theme	Description	Frequency of presence	Example (codes only)
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Positive perceptions of Future Me			
Clarity and practicality	Mentions Future Me helping them find clarity of thought or clarity regarding actionable steps	85%	<i>“So even though I knew that there's a tension, maybe, between career goals and financial aspirations, to have it laid out concretely in text was probably quite useful, because it means it's not just a hypothesis in my mind.”</i>
Facilitating personal reflection	Mentions Future Me helping facilitate a self-questioning about their values, motivation and goals	80%	<i>“I do quite like the way it was sort of prompting me to sort of think about my future in a way. So, it asked me questions like, okay, how do you feel about this? And about this opportunity? And what are your goals, for example. So, it was quite interesting how it sort of prompted, I guess, thoughts on my part.”</i>
New knowledge, perspectives and ideas	Mentions Future Me providing them with new knowledge or ideas to help them make decisions or work towards a goal	70%	<i>“I need to actually look for programs that are APA-certified, you know, things that I didn't really realise before and that's helpful to look into. Now, I have like specific things to move forward in”</i>
Reaffirming and consolidating	Mentions finding the conversation with Future Me reaffirming, reassuring or Future Me helping them to reconsolidate and remind them of existing knowledge and advice.	65%	<i>“I was reminded of things I feel like it's more just revision, almost, consolidation, yeah, consolidation because it's answering a specific question, it puts everything related to that question together so that's more, maybe the helpful part”</i>
Comparison to human conversation	Mentions Future Me helping them to question their own values, intentions or desires about the future.	65%	<i>“Everything was kind of connected to what I was saying, and there was some, some kind of objectively good advice that it was the kind of thing that you imagine someone who actually was human would give you”</i>
Text message format	Mentions liking the text message format of Future Me	50%	<i>“Phone texting is already a mechanism people are used to so it's not something additional like for me it's like a very natural thing to do, like text and receive answers it was just very easy to use”</i>

Table 5: Negative themes found in the user feedback about FutureMe

Theme	Description	Frequency of presence	Example (codes only)
Negative Perceptions of Future Me			
User dependence	Mentions that they dislike or find it difficult that Future Me is primarily led by their messages rather than Future Me	70%	<i>"I think the chatbot was kind of lazy. I think most of the burden was on me to think about my future, like to kind of prime it, or to guide the conversation."</i>
Formulaic	Mentions that Future Me's responses are formulaic, generic and predictable	60%	<i>"It also felt a bit automatic because a lot of the advice that I got was very similar to each other. It repeated a bunch of things, not like actual sentences, but like advice, things that I should do."</i>
Lacking something human	Mentions that they found the interaction with Future Me to be lacking something inherently human, such as lacking intention or subjective experience	50%	<i>"While it may be helpful, I don't know how much I could fully buy into it, just with the knowledge that it wasn't a living and breathing person at the other end of the phone so there might be less trust because I think when it comes to the advice."</i>
Conversation flow	References that conversation flow with Future Me was somehow problematic for them	45%	<i>"There was a bit of like a lag in it's like immediate response I felt like I was using it wrong like that something I had said was making it like malfunction so I was kind of like second guessing myself Or I thought that maybe like my phone signal had died, or something, so it wouldn't be able to respond."</i>

Table 6: Themes revealed from the thematic analysis of the baseline interview transcripts (N=14)

Theme	Description	Frequency	Example
Trust and Emotional Openness	This theme captures the complex relationship between trust, emotional connection, and the use of chatbots. It includes concerns about the lack of human warmth and the potential impact of university affiliations on trust, as well as the positive influence of anonymity and peer experiences on openness and trust.	7/14	<i>"I'm not sure how a digital tool could replicate the compassionate side [of humans]...if you're emotional and you're crying, people can understand that and comfort you, you know a human would give you a tissue or whatever, whether they [chatbots] could match that would be a concern of mine"</i>
Role and Effectiveness	This theme explores how students perceive the role of chatbots in their stress management strategies, especially compared to human support. It includes the perceived advantages of chatbots (e.g., objectivity, immediacy) and the	6/14	<i>"A digital tool can be useful when you are normally stressed out. But when you are very stressed, you might want to look for a real person to help...my mom or my friends know what kind of person I am, what I need, what type of comfort I need. When it comes to a digital tool, they are quite general...so that's where the disconnect might come from."</i>

	limitations (e.g., emotional understanding, compassion).		
Personalisation and Contextual Awareness	This theme focuses on the students' desire for personalised and contextually aware chatbot interactions. It highlights the need for chatbots to be knowledgeable about the students' specific academic pressures and stressors and to tailor their responses accordingly.	6/14	<i>"If [chatbot] had background knowledge on her course it would know that I have deadlines or a dissertation coming up and it would know that I might be more stressed around those dates. So maybe the digital tool will be like, 'hey are you okay?', which is basically the same as my friends asking me 'how is your dissertation going?'"</i>

Table 7 Themes identified from the thematic analysis of participants' inputs during conversations with FutureMe (N=12).

Theme	Description	Frequency	Example
Academic stress: quick tips for stress relief, time management advice	They expressed stress related to their academic responsibilities, including the pressure of dissertation deadlines, their research workload and their performance in exams and presentations. They sought quick tips for stress relief, as well as practical advice on how to manage their time across competing priorities and break down projects into smaller, more manageable tasks.	9/12	<i>"I'm nervous because I think I'm not well prepared for the presentation but it is so hard that I feel unbearable sitting here thinking about it. That's why I'm not sure about the idea of getting some rest – I'm afraid that I will be wasting my time."</i>
Negative emotions and low motivation: practical tips to boost motivation, emotional validation, help understanding emotions	They described negative emotions and struggles with their mental well-being, including feelings of anxiety, sadness and a lack of motivation. They sought practical tips on how to improve their motivation, as well as validation for their negative emotions and information to help them understand the potential reasons behind those emotions.	7/12	<i>"Can you help me figure out why I am sad?"</i>
Future uncertainty: advice on handling uncertainties, self-reflection	The uncertainty about the future, particularly concerning job prospects and long-term plans, was a major source of stress. They sought guidance on managing these uncertainties and reflected on their goals and values to make informed decisions and consider potential solutions to their future concerns.	7/12	<i>"I am stressed about leaving the country this summer and getting a job after graduation."</i>
Social relationships: coping advice, friendship advice	Social relationships were another area of stress. International students who are newer to the UK expressed concerns around making new friends. They sought advice on how to maintain previous connections and cope with their loneliness.	3/12	<i>"I don't know how to make friends at the pool...I usually feel too shy to talk to other people until they speak to me first."</i>

Table 8: Themes revealed from the thematic analysis of the follow-up interview transcripts (N=12)

Theme	Description	Frequency	Example
Accessible and convenient	Participants appreciated that FutureMe provided easily accessible, persistent support, especially during off-hours when friends, family, or professional help were unavailable. This accessibility allowed them to manage stress at their own pace without feeling like they were burdening others or that their stress wasn't significant enough to seek human support. Many participants noted that having a tool available 24/7 gave them autonomy in managing their well-being, particularly when traditional mental health services were limited to standard office hours.	7/12	<i>"If you're stressed even in the night then you know that this [FutureMe] would respond to you as opposed to a friend that's fallen asleep...it gives you the option to manage your stress at all hours as opposed to just at 5:00 PM. I know a lot of mental health professional systems are nine to five, or 'eight to four we'll have a live chat system', as opposed to something that is 24 hours a day."</i>
Personalized and relatable	Participants valued the personalized interactions provided by FutureMe, which helped them feel more engaged and comfortable. They appreciated that the chatbot's conversational, friendly tone made interactions feel less formal and more like a conversation with a peer. Many participants noted that the responses felt tailored and relevant, which encouraged further use of the chatbot over time. However, there were mixed reactions regarding the depth of personalization, with some participants noting that over time, responses started to feel somewhat repetitive.	5/12	<i>"It almost felt like it [FutureMe] had a mind of its own which felt nice, it didn't feel very scripted. It actually felt like it was able to understand what I was saying and respond with relevant questions."</i>
Need better balance between practical advice and emotional support	Participants appreciated that FutureMe provided easily accessible, persistent support, especially during off-hours when friends, family, or professional help were unavailable. This accessibility allowed them to manage stress at their own pace without feeling like they were burdening others or that their stress wasn't significant enough to seek human support. Many participants noted that having a tool available 24/7 gave them autonomy in managing their well-being, particularly when traditional mental health services were limited to standard office hours.	7/12	<i>"If you're stressed even in the night then you know that this [FutureMe] would respond to you as opposed to a friend that's fallen asleep. . . it gives you the option to manage your stress at all hours as opposed to just at 5:00 PM. I know a lot of mental health professional systems are nine to five, or 'eight to four we'll have a live chat system', as opposed to something that is 24 hours a day."</i>
Want responses that are more tailored to the current context and stress	Participants expressed a strong desire for FutureMe's responses to be more context-sensitive and responsive to their immediate stress levels. They suggested that the chatbot ask fewer questions during periods of intense stress and offer more support that aligned with their emotional needs at the time. Many participants felt that a voice-based interaction could enhance the sense of	7/12	<i>"Having a voice would feel more comforting and would make it easier to talk about how you feel, especially if you just wanna get stuff off your chest. Typing can take ages and you can miss out a lot of stuff in the interest of time, but if you're talking that would be very helpful. . . If you're in a very</i>

level	personalization, especially when they were in a frantic or emotional state, as typing felt time-consuming and less expressive. Voice input, they believed, would allow them to convey their emotions more naturally and feel a greater connection to the chatbot		<i>frantic mood, the voice would definitely be better because it's hard to convey how you feel in that moment over text."</i>
Envision integration with human support systems	While participants saw FutureMe as a helpful tool for initial stress relief, they viewed it as complementary to, rather than a replacement for, human support. They felt that FutureMe's role should involve offering practical advice and guiding them toward human help when needed, especially during crises. Participants expressed the need for FutureMe to integrate more seamlessly with university mental health services or external resources, offering clear pathways to professional help when the chatbot's capabilities were insufficient.	8/12	<i>"If something was more serious and someone wanted to seek professional help, then perhaps a link or an avenue or number for help, whether this is through your university or not, would be good because it would allow you to think, OK, maybe I do need help. . . it opens the door of professional help if someone does need it"</i>

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Supplementary Files

Multimedia Appendixes

Summary of all quotes in tables.

URL: <http://asset.jmir.pub/assets/391d07148ba8186732e2efc708c3e51e.docx>