

University of Tartu
Faculty of Social Sciences
Institute of Education
Curriculum of Educational Technology

Leonardo De la Hoz Borrego

REFLECTING ON HEALTH AND SUSTAINABILITY: A GPT-POWERED
INTERVENTION TO SUPPORT PARENTAL AWARENESS AND
FAMILY WELL-BEING

MA thesis

Supervisor: Liisi Pajula

Tartu 2026

Abstract

This study explored how a GPT-powered conversational assistant can support parents in reflecting on daily health and sustainability habits. Using a qualitative design, brief AI-mediated reflection sessions were conducted with 20 parents from a Colombian school. Thematic analysis of transcripts, utilizing the Transtheoretical Model (TTM), yielded five themes: awareness of unnoticed routines, emotional tension, emerging agency through micro-decisions, family dynamics, and ambivalence toward sustainability. TTM mapping revealed a diverse distribution of readiness, from contemplation to maintenance. Findings suggest that conversational AI, when designed for emotional safety and learner autonomy, facilitates meaningful introspection and early-stage readiness for behavior change. The assistant functioned as an "AI Extender," scaffolding reflective capacity and offering a replicable model for dialogue-based sustainability education.

Keywords: conversational AI, reflective learning, behavior change, sustainability education, Transtheoretical Model (TTM), adult learners.

Lühikokkuvõte

Käesolevas uuringus uuriti, kuidas GPT-põhine vestlusassistent saab toetada lapsevanemaid igapäevaste tervise ja jätkusuutlikkusega seotud harjumuste reflekteerimisel. Kasutades kvalitatiivset disaini, viidi läbi lühikesed tehisintellekti vahendatud refleksioonisessioonid 20 Colombia kooli lapsevanemaga. Transkriptsioonide temaatiline analüüs, mis kasutas transteoreetilist mudelit (TTM), tõi esile viis teemat: teadlikkus märkamatutest rutiinidest, emotsionaalne pinge, tähtsavad agentsus mikroosustest kaudu, perekonna dünaamika ja ambivalentsus jätkusuutlikkuse suhtes. TTM-i kaardistamine näitas valmisoleku mitmekesisest jaotumist alates kontemplatsioonist kuni säilitamiseni. Tulemused viitavad sellele, et vestluslik tehisintellekt, kui see on loodud emotsionaalset turvalisust ja õppija autonoomiat silmas pidades, soodustab sisulist enesevaatlust ja varajase staadiumi valmisolekut käitumise muutmiseks. Assistent toimus kui "tehisintellekti laiendaja" (AI Extender), toetades reflektiivset võimekust ja pakkudes korratavat mudelit dialoogipõhiseks jätkusuutlikkuse hariduseks.

Märksõnad: vestluslik tehisintellekt, reflektiivne õpe, käitumise muutmine, jätkusuutlikkuse haridus, transteoreetiline mudel (TTM), täiskasvanud õppijad.

Table of Contents

Abstract	2
Lühikokkuvõte	3
Introduction	6
Theoretical Overview	7
Health as a Driver for Sustainable Behavior Change	8
Theories of Behavior Change	8
Adult Learning and Reflection	9
Emotionally Intelligent and Technology-Mediated Reflection	11
Method	12
Researcher Positionality	12
Theoretical Basis for the Assistant's Design	13
Research Design	14
Sample	15
Data Collection Methods	16
Procedure	16
Data Analysis	17
Results and Discussion	18
Results	18
RQ1. What kinds of reflective insights emerged when parents interacted with the GPT-powered assistant?	18
RQ1.1. How do these reflections illustrate participants' stage of change, as interpreted through the Transtheoretical Model?	21
RQ2. What reactions did participants report when interacting with the agent?	23
RQ2.1. Which design features and interactional elements of the assistant did participants report as supporting emotionally safe and meaningful engagement?	23
Discussion	25
Reflection as a Catalyst for Awareness (SDL & Transformative Learning)	25
Emotional Tension and the Readiness to Change (TTM)	26
Micro-Decisions and Emerging Agency (Habit Theory & COM-B)	26
Family Dynamics as Behavioral Reinforcers (Social Learning Theory)	27
The Intention–Behavior Gap	28
How the Assistant Supported Engagement (Emotional Design & Pedagogy)	28
Implications for Educational Technology	30
Situating the Findings Within the Field	30
Limitations	31
Conclusions	32
Recommendations and Practical Implications	32
Acknowledgments	34
List of References	35
Appendix A. Configuration and Conversational Design of jAvler (Custom GPT Assistant)	39

Appendix B. Informed Consent Form (Translated from Spanish)	41
Appendix C. Scope and Ethical Boundaries of the Report for the Author (RPA)	42
Appendix D. Thematic Findings and Supporting Quotations by Research Question	44
Appendix E. Codebook	47
Simple License for Reproduction and Public Access to the Graduation Thesis	49

Introduction

As families navigate daily decisions related to food, movement, rest, and resource use, opportunities to align well-being with environmental sustainability frequently emerge, but are often overlooked (Sheeran & Webb, 2016; Osbaldiston & Schott, 2012). Supporting parents in noticing and reflecting on these everyday habits can open meaningful pathways for both personal transformation and broader ecological responsibility. This thesis explores how digital conversational tools, specifically a GPT-powered assistant, can facilitate low-pressure, emotionally safe reflection to encourage behavior change in both domains.

While health and sustainability are often addressed separately, they are deeply interconnected. Choices in nutrition, transport, and digital habits affect not only personal well-being but also carbon emissions, public health burdens, and intergenerational equity. “Sustainable health” has been defined as a multisectoral field that promotes well-being within the limits of planetary boundaries (Wanyenze et al., 2023). Framing sustainable living in terms of personal health gains has shown to increase individual motivation for pro-environmental action (Diefenbach, 2021). Yet everyday intentions toward healthier or more sustainable habits often fail to translate into action, reflecting well-documented gaps shaped by routines, contextual pressures, and emotional tensions (Sheeran, 2002; Sheeran & Webb, 2016).

Despite the relevance of family routines in shaping these outcomes, most educational interventions still prioritize children or school-based curricula. Yet parents play a foundational role, not only as decision-makers and role models, but also as learners. Empowering them to reflect on their own habits and intentions can generate ripple effects within the household and beyond (Kalamas et al., 2014). This aligns with adult learning principles that emphasize autonomy, real-life application and problem-centered engagement (Knowles et al., 2020).

Recent advances in artificial intelligence, particularly large language models (LLMs), offer new opportunities to design supportive, human-like digital companions. Conversational agents such as ChatGPT are increasingly being used in wellness and self-development contexts, including journaling, goal setting, and health tracking (Miner et al., 2020). These tools foster emotionally intelligent, dialogical experiences that can scaffold habit awareness without judgment or prescriptive advice. When grounded in behavioral and learning theory, they offer a promising approach to reflective education that is accessible, scalable, deeply personalized, and particularly suited to learners in the early stages of behavior change.

Several studies have demonstrated that conversational agents can be effective in promoting reflection and behavior change when designed with empathy and context-awareness (Fitzpatrick et al., 2017; Maher et al., 2020). In this study, a conversational assistant was designed to support parents in exploring their lifestyle habits through brief daily prompts related to food, movement, rest, and sustainability.

Theoretical Overview

Many people express concern about environmental problems or claim to value sustainability, yet these values are often not reflected in their everyday decisions or habits — a disconnect known in the literature as the value–intention–action gap (Sheeran, 2002). This disconnect has been widely documented in behavioral science, where researchers have examined the factors that hinder or promote sustainable actions. A review by Osbaldiston and Schott (2012) synthesized over 80 empirical studies and found that interventions such as commitment, goal setting, prompts, and feedback were consistently effective in promoting pro-environmental behaviors. These findings suggest that beyond awareness, intentional design of behavioral support mechanisms is critical to achieving meaningful change.

One promising pedagogical approach is to emphasize the personal health benefits of sustainable living. A growing body of research suggests that linking pro-environmental behaviors to concrete well-being outcomes, such as improved physical fitness, stress reduction, or family health, can increase motivation and action (Osbaldiston & Schott, 2012; Diefenbach, 2021; Mullins & Wachter, 2022).

Educational efforts that aim to integrate sustainability and health must go beyond the transmission of knowledge. They require affective engagement, critical reflection, and personalized learning pathways that support individuals in re-evaluating routines and adopting meaningful lifestyle changes (Mezirow, 1991; Sterling, 2010; Wals & Dillon, 2013). To achieve this, a theoretical foundation is needed that combines insights from adult learning, behavior change, and reflective dialogue.

The following sections examine the relevant educational and psychological theories that inform this study's design. These include adult learning theory, particularly transformative and constructivist perspectives, as well as behavior change models and frameworks for emotionally safe, technology-mediated reflection. Together, they provide the conceptual basis for understanding how a GPT-powered assistant can facilitate behavior change through guided, self-directed dialogue.

Health as a Driver for Sustainable Behavior Change

Research indicates that drawing connections between sustainability and personal health can significantly increase an individual's motivation to adopt eco-friendly behaviors. This is supported by a comprehensive review of intervention studies by Osbaldiston and Schott (2012), who found that behavior change strategies emphasizing concrete personal benefits, such as improved health, reduced stress, or family well-being, consistently promoted pro-environmental actions. Many people are more immediately concerned with their own well-being (and that of their family) than with abstract environmental risks (Diefenbach, 2021). For these individuals, reframing sustainability in terms of direct health gains can be a powerful engagement strategy. For example, communicating the co-benefits of climate action, cleaner air, healthier diets, or safer active lifestyles helps ground sustainability in everyday personal outcomes. Studies have found that emphasizing such co-benefits (e.g., improved health, financial savings, and community well-being) makes pro-environmental messages more acceptable and motivating than appeals based solely on ecological impact (Diefenbach, 2021).

In particular, framing issues like climate change as threats to personal health and safety (rather than only to polar bears or distant futures) can prompt action even among those who are initially doubtful. Mullins & Wachter (2022), for example, conducted a study in which participants who encountered climate information presented as a health and safety risk (with actionable solutions) showed significantly increased personal motivation to act. This approach leverages the psychology of self-interest: people are inclined to change habits if they perceive tangible benefits to their health, such as better fitness, disease prevention, or reduced stress. Thus, highlighting how sustainable living is also healthy living can broaden the appeal of sustainability education, engaging learners who might otherwise feel apathetic or skeptical about environmental causes.

Theories of Behavior Change

A wide range of behavior change theories exist, each offering different perspectives on how people move from intention to action. For this study, the Transtheoretical Model (TTM) was selected as the primary analytical lens, given its particular relevance to understanding participants' readiness for change across the study's five lifestyle domains. Two additional models — the Theory of Planned Behavior (TPB) and Social Cognitive Theory (SCT) — informed the conversational design of the assistant but were not used as primary frameworks for analysis.

The Transtheoretical Model (Prochaska & DiClemente, 1983) conceptualizes change as a process that unfolds in stages: precontemplation, contemplation, preparation, action, and maintenance. Each stage reflects a different level of readiness and requires tailored support. Central constructs include decisional balance — the weighing of pros and cons of change — and self-efficacy, which reflects the individual's confidence in their ability to act. In this study, participant reflections were mapped onto TTM stages using linguistic cues indicating awareness, intention, planning, or early action. The TTM has been widely applied in health behavior research, sustainability education, and digital intervention design, proving particularly effective for tailoring support to individuals at different points of readiness (Barrett et al., 2016; Ek et al., 2020).

The Theory of Planned Behavior (Ajzen, 1991) and Social Cognitive Theory (Bandura, 1986) provided complementary insights that shaped the assistant's conversational prompts. TPB's constructs of attitudes, subjective norms, and perceived behavioral control informed questions designed to explore participants' beliefs about their routines and their confidence in making changes. SCT's emphasis on self-efficacy and reciprocal determinism informed the assistant's approach to reinforcing small actions and supporting a sense of personal agency. Together, these two frameworks contributed to the assistant's design logic without serving as post-hoc analytical tools.

These models have been widely applied in health promotion, sustainability education, and digital behavior change interventions (Barrett et al., 2016; Ek et al., 2020), providing a solid empirical basis for their inclusion in both the design and interpretation of this study.

Adult Learning and Reflection

To better understand how reflective tools like conversational prompts can support behavior change, it is useful to consider how adults engage with learning experiences. Adult learning theory provides valuable insight into how relevance, autonomy, and personal meaning shape the learning process in sustainability interventions.

Reflection, as used in this study, refers to the deliberate process of examining one's own thoughts, beliefs, and behaviors in order to generate new understanding or reconsider established patterns (Mezirow, 1991; Boud et al., 1985). Unlike simple recall or evaluation, reflection involves a degree of critical distance — a pause in which the individual steps back from routine action to interrogate its meaning. Multiple models of reflective practice exist, from Kolb's (1984) experiential learning cycle to Gibbs' (1988) structured reflection framework; what they share is the view that learning deepens when experience is actively processed rather than passively absorbed.

Adult learning theory emphasizes autonomy, experience, and the relevance of content to the learner's life. Knowles et al. (2020) describe adult learners as self-directed individuals who benefit most when learning is problem-centered, immediately applicable, and connected to their lived experience. These principles are foundational in designing educational interventions that aim to transform personal habits.

Reflection plays a central role in how adults internalize new perspectives and make sense of their lived experiences. It encourages individuals to critically examine their values, assumptions, and routines—opening the possibility for meaningful personal change (Mezirow, 1997). In the context of sustainability and health, this kind of self-awareness is essential for shifting deeply embedded behaviors. Learning through exploration and interaction with ideas, people, or environments allows individuals to construct understanding in a way that feels relevant and authentic (Kolb, 1984). In digital settings, reflective prompts can gently guide this process, supporting both individual insight and the development of new, sustainable habits.

Transformative Learning Theory (Mezirow, 1991) adds a further dimension: adults change not only behaviors but underlying assumptions. When a familiar routine is questioned—however gently—it can trigger a process of critical reflection that opens the possibility of perspective shift. This process is particularly relevant in sustainability and health contexts, where deeply embedded habits often resist purely informational interventions.

Constructivist perspectives (Piaget, 1952; Vygotsky, 1978) further suggest that learning is most meaningful when it emerges from the learner's own experience through active engagement rather than passive reception. In dialogue-based environments, this translates into a preference for responsive, learner-led interaction over predetermined content delivery.

Research by Kalamas et al. (2014) further supports the idea that adults are more likely to engage in pro-environmental behaviors when they perceive personal agency and emotional resonance in the learning process. Reflection, then, is not simply a cognitive exercise, but also an affective one, linked to motivation, value alignment, and behavior change.

In this study, reflection is positioned as both the mechanism and the outcome of interaction with the GPT-powered assistant. The conversational design aimed to support learner autonomy, allow emotional expression, and guide attention to daily choices. These aims are aligned with the principles of adult learning theory and form the foundation for the theoretical design of the intervention.

Emotionally Intelligent and Technology-Mediated Reflection

Reflection is not solely a cognitive process—it is also emotional. The quality of reflection often depends on whether learners feel psychologically safe, respected, and emotionally supported. In adult learning contexts, emotional safety fosters vulnerability and authentic insight, which are essential for examining personal habits and confronting uncomfortable truths (Mezirow, 1991).

Technology-mediated environments, especially those using conversational agents, can support emotionally intelligent reflection if designed with care. Tools like chatbots and AI assistants have been successfully used to promote self-awareness and behavior change in domains such as wellness, mental health, and education (Miner et al., 2020; Bickmore & Picard, 2005). These systems can act as nonjudgmental companions that respond with empathy, ask personalized questions, and support autonomous decision-making over time.

The use of emotionally intelligent AI systems aligns with current trends in personalized and affective computing. By recognizing tone, context, and user intent, such systems can provide relevant prompts that support self-regulation and identity development (D'Mello & Graesser, 2012). When applied in sustainability or health education, these systems offer scalable ways to engage individuals in meaningful, reflective dialogue without relying on human facilitation.

Digital behavior change interventions (DBCI) have shown promise in promoting more sustainable consumption patterns, particularly in food-related domains. Hedin et al. (2019), in a systematic review, examined a range of DBCIs designed to reduce the environmental impact of individual food behaviors.

One notable example involved a smart kitchen bin that automatically recorded the weight and type of discarded food waste, helping households become more aware of their food disposal habits. Such interventions blend technology with feedback and awareness-building in everyday contexts, an approach that aligns conceptually with the assistant used in this study (Hedin et al., 2019).

While the present research did not focus exclusively on food sustainability, it drew on broader insights from DBCI research showing that lightweight digital tools can support awareness-building in everyday contexts. Hedin et al.'s (2019) findings highlight how scalable, low-intensity interventions can facilitate behavioral insight, providing a theoretical foundation for exploring similar mechanisms in sustainability-related domains.

Recent developments in educational technology suggest that AI-powered conversational agents can serve as low-intensity, personalized companions that facilitate habit

awareness and support emotionally safe engagement with lifestyle behaviors (Miner et al., 2020; Knowles et al., 2020). When designed with empathy and theoretical grounding, these tools can open up new reflective spaces outside formal education.

To fulfil this aim, the study addressed the following **research questions**:

RQ1. What kinds of reflective insights emerged when parents interacted with the GPT-powered assistant?

RQ1.1. How do these reflections illustrate participants' stage of change, as interpreted through the Transtheoretical Model?

RQ2. What reactions did participants report when interacting with the agent?

RQ2.1. Which design features and interactional elements of the assistant did participants report as supporting emotionally safe and meaningful engagement?

Method

Researcher Positionality

This study is not conducted from a position of neutral observation. My engagement with the themes of health, habit change, and conversational AI is personal, and I consider it important to make this transparent, as it shaped both the design of the intervention and my interpretive lens throughout the analysis.

My interest in this topic stems from lived experience with behavior change. In 2017, following a stress-related medical leave, I began reflecting on the gap between my own values and daily routines — particularly around sleep, work boundaries, and self-care. That experience of noticing and gradually adjusting habits became a direct reference point for this research. I was not studying behavior change from the outside; I had navigated it from within.

This personal history shaped two key assumptions entering the study. First, I assumed that low-pressure, non-judgmental prompts would be more effective than structured advice for adults in early stages of change — because that is what I had found useful myself. Second, I assumed that linking sustainability to personal well-being would increase engagement, given that my own motivation for sustainable living was inseparable from health concerns. These assumptions informed the assistant's design and, inevitably, my interpretive lens during analysis.

I am also aware that my role as both designer and analyst of the intervention carries inherent risk of confirmation bias. I have attempted to hold this dual role with care, using thematic analysis to stay grounded in participants' voices rather than my own expectations. Moments where the data contradicted my assumptions — such as participants who remained skeptical or disengaged — were treated as analytically significant rather than peripheral.

Theoretical Basis for the Assistant's Design

The design of the GPT-powered assistant used in this study was guided by a synthesis of the theories previously discussed. Its configuration was not purely technical, but pedagogical and psychological, built to foster reflection, emotional engagement, and gradual behavior change among adult learners.

From Transformative Learning Theory (Mezirow, 1997), the assistant drew its emphasis on dissonance and perspective-shifting. Prompts were crafted to gently challenge assumptions, using real-life domains such as food, transport, or sleep to invite users to reexamine their routines in light of health and sustainability values. In this context, health values included physical well-being, rest, and emotional balance, while sustainability values emphasized mindful consumption, energy use, and food-related waste.

Constructivist learning theory (Piaget, 1952; Vygotsky, 1978) informed the assistant's learner-led format. Rather than deliver pre-set advice, the assistant followed the user's ideas and reflections, supporting meaning-making through open-ended prompts. This allowed participants to connect new insights to their prior experiences, reinforcing contextual learning.

The assistant's emotional tone and dialogic rhythm were shaped by adult learning principles (Knowles et al., 2020) and recent advances in emotionally intelligent computing (Miner et al., 2020). It avoided authoritative language, favored empathetic statements, and responded without judgment to encourage psychological safety.

The TTM informed the overall arc of the assistant's interactions — prompts were designed to meet participants at different levels of readiness, offering gentle awareness-building for those in contemplation and reinforcing small actions for those approaching preparation or action. TPB and SCT contributed specific design elements: questions exploring beliefs and perceived control (TPB), and prompts reinforcing agency and self-efficacy (SCT). These frameworks shaped the assistant's conversational logic without being used as post-hoc analytical tools.

These design decisions collectively aimed to balance structure with freedom, emotion with analysis, and learning with autonomy — creating a reflective space that honored each participant's unique path toward awareness and change.

Concretely, the assistant incorporated emotionally intelligent cues into its prompts, using language that affirmed user agency and curiosity. Its interaction style was informed by principles of dialogic learning and motivational interviewing, aiming to reduce defensiveness

and encourage openness. The assistant did not diagnose or correct, but rather supported users in exploring their habits and emotions in a low-pressure environment.

The combination of emotionally intelligent design with AI-based delivery was intended to create an opportunity for learners to encounter themselves more clearly. By inviting personalized, emotionally safe reflection, the assistant was configured to help parents describe their everyday habits and concerns in their own words, without evaluation or advice.

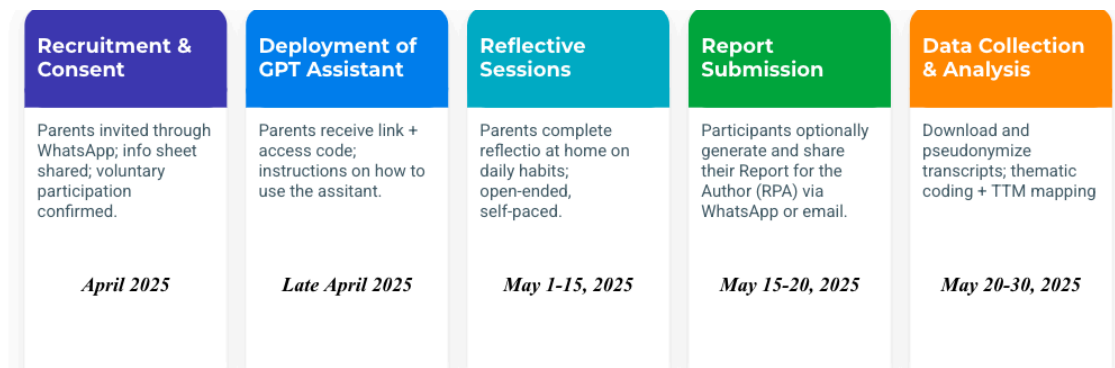
Research Design

This study employed a qualitative design grounded in constructivist and transformative learning paradigms, with a particular emphasis on digital reflection as a catalyst for awareness and behavior change. The primary aim was to understand how a conversational assistant could support reflective engagement with everyday habits related to health and sustainability. Given the exploratory nature of this inquiry, a flexible and context-sensitive design was prioritized.

Rather than seeking to measure behavioral outcomes quantitatively, the study focused on the reflective process itself: how participants expressed awareness, emotional responses, intentions, and perceived agency when prompted by an AI assistant. This required a design that allowed for open-ended interaction, minimal researcher intervention, and ecologically valid settings that preserved participants' autonomy.

The research was inspired by principles of design-based research (DBR). While not structured as a multi-phase DBR cycle, the intervention was grounded in iterative design informed by adult learning theory, behavior change models, and emotional design principles. The assistant (jAvIer) was carefully configured to offer psychologically safe prompts without evaluative or instructional tone.

Data were collected through GPT-assisted reflection sessions in which participants engaged voluntarily and at their own pace. This single-source qualitative design was chosen to honor the complexity of everyday decision-making around health and sustainability while positioning human-AI dialogue as an emergent pedagogical tool. The assistant was treated not as a control mechanism or intervention in the traditional sense, but as a reflective companion shaped by the theoretical constructs of self-directed learning, emotionally intelligent communication, and readiness-based change.

Figure 1. *Study Procedure Timeline*

Note. The diagram summarizes the five main procedural steps of the study, from participant recruitment to data analysis.

Sample

The participant group consisted of 20 parents from a school located in Colombia. All participants had at least one child enrolled in grade 4 and were recruited through existing parent WhatsApp groups. An invitation message was sent to approximately 80 families across four grade-level subgroups (4A–4D), introducing the purpose of the study and how the conversational assistant could be used.

Participation was entirely voluntary and required no prior technical expertise. The invitation emphasized that the assistant was designed to promote low-pressure, non-judgmental reflection and that no evaluation or follow-up would be conducted. Parents were informed that they could choose to interact with the assistant once or multiple times, and that only shared reports would be included in the analysis.

The final sample of 20 participants included parents of diverse professional backgrounds, including educators, health professionals, administrative staff, and entrepreneurs. Most self-reported high digital literacy, and several had prior experience using messaging tools or chat-based applications. Only about 7 of them had previously installed the chatGPT app on their devices. Gender distribution was not tracked formally but was inferred to be approximately balanced, based on participant names and family context.

Participants were not required to provide identifying demographic data, in keeping with the study's ethical commitment to anonymity and minimal data collection. Instead, each transcript was assigned a pseudonym and a coded identifier at the point of submission. No compensation was offered, and no in-person sessions were required.

Data Collection Methods

The study relied on one primary source of qualitative data: GPT-assisted transcripts voluntarily submitted by participating parents. This method was selected for its ability to capture internal reflections without imposing artificial structure or measurement.

The core tool was a GPT-powered assistant referred to throughout the study as jAvIer. The name is a stylized blend of "Javier" and "AI," chosen to evoke a relatable identity while highlighting the assistant's artificial intelligence foundation. Participants accessed jAvIer directly through the official ChatGPT mobile application, available on the Play Store and Apple Store. No custom API or private platform was used. The assistant guided users through emotionally safe, structured reflection based on pre-set interaction design and tone configurations embedded in the app.

Parents were invited to use the assistant on their own devices and at a time of their choosing. The assistant responded in Spanish by default, reflecting the participants' preferred language, but users could switch languages at any moment; the system handled multilingual input without requiring any additional configuration. It prompted users to reflect on five core domains: food, movement, sleep, consumption, and sustainable home practices. These domains were selected because they represent everyday lifestyle areas with significant potential for sustainable impact, connecting personal well-being with broader environmental implications.

Each session consisted of a guided conversation ranging from 5 to 15 turns. The assistant's language and pacing were designed to promote emotional safety, self-discovery, and learner autonomy. Users were able to end the conversation at any point or redirect it by asking questions, although most participants followed the assistant's flow. At the conclusion of each session, participants had the option to review, edit, and share their interaction reports (RPA) with the researcher.

All participants were native Spanish speakers, and all interactions with the assistant took place in Spanish. Transcript excerpts included in this thesis have been translated into English by the researcher. Translations prioritize fidelity to meaning and tone over literal equivalence, in line with best practices for qualitative research involving non-English data (Temple & Young, 2004).

Procedure

The study followed a single-phase procedure centered on AI-mediated reflection using a GPT assistant. The full process took place over approximately two weeks of remote, app-based interaction.

After ethical approval was granted, participants were informed about the study through a structured invitation message shared via WhatsApp. The message described the study's purpose, the voluntary nature of participation, the five lifestyle domains covered by the assistant, and the type of data to be collected. It explicitly stated that no personal identifying information would be stored, that sessions were self-directed, and that participants could withdraw at any time without consequence. An information sheet summarizing these points was attached to the invitation (see Appendix B).

Informed consent was gathered through an opt-in mechanism: participants were considered to have consented only when they chose to generate and actively share their Report for the Author (RPA) with the researcher via WhatsApp or email. This act of sharing was treated as explicit, voluntary consent to include their anonymized reflections in the study. Participants who did not share their report retained full privacy and were not included in the analysis.

Participants downloaded the official ChatGPT app (OpenAI) on their own mobile devices. Once activated, they received a custom alphanumeric code and a link to jAvIer, pre-configured by the researcher through OpenAI's Custom GPT tools. No installation or technical configuration was required. Users were free to interact with the assistant at any time during a two-week window.

Each interaction began with a short introductory message and a question inviting participants to choose a lifestyle domain to reflect on (e.g., food, movement, sleep). The assistant then guided the conversation using open-ended prompts, emotionally safe language, and occasional motivational closings. Sessions typically lasted 5 to 10 conversational turns and ended with an invitation to share or discard the transcript.

All data were pseudonymized before analysis. GPT session logs were downloaded and labeled with anonymous codes. Participants could withdraw their contributions at any time without consequence. No video, photos, or audio recordings were collected.

Data Analysis

The analysis followed a qualitative thematic approach based on the six-phase method proposed by Braun and Clarke (2006).

Phase 1 — Familiarization with the data. Data consisted exclusively of anonymized GPT-based conversation logs voluntarily submitted by participating parents. Each transcript was read repeatedly to ensure familiarity before any coding began. This immersive reading allowed initial impressions and recurring patterns to surface organically.

Phase 2 — Generating initial codes. An initial set of open codes was developed combining deductive and inductive strategies. Three deductive codes were identified a priori from the theoretical framework: self-efficacy (Bandura, 1986; Prochaska & DiClemente, 1983), decisional balance (Prochaska & DiClemente, 1983), and critical reflection (Mezirow, 1997). Three additional inductive codes emerged through immersion in the dataset: structural barrier, emotional load, and micro-action. A complete codebook including definitions, sources, and examples is provided in Appendix E.

Phase 3 — Searching for themes. Codes were applied to each of the 20 transcripts using a three-level scale — Absent, Present, or Central — to capture not only the presence but the relative weight of each code within each case. Coded segments were then clustered into broader thematic categories through iterative comparison and refinement.

Phase 4 — Reviewing themes. Emerging themes were reviewed against the full dataset to ensure they were coherent, distinct, and grounded in the data. This process yielded five recurrent themes: awareness of unnoticed routines, emotional tension surrounding habit change, emerging agency through micro-decisions, the influence of family dynamics, and ambivalence toward sustainability.

Phase 5 — Defining and naming themes. Each theme was defined and named to capture its essential quality. Representative excerpts were selected to illustrate each theme, preserving participants' voices and ensuring that analysis remained grounded in the data.

Phase 6 — Producing the report. In parallel, participant expressions were examined for linguistic cues related to the TTM (Prochaska & DiClemente, 1983). Statements indicating contemplation, intention, planning, action, or maintenance were used to estimate each individual's readiness stage, presented in Table 1 in the Results section.

To preserve anonymity, all participant names were replaced with pseudonyms. Data were stored securely and analyzed manually without specialized qualitative software, consistent with Patton's (2015) emphasis on credibility and trustworthiness in qualitative inquiry.

Results and Discussion

Results

RQ1. What kinds of reflective insights emerged when parents interacted with the GPT-powered assistant?

Thematic analysis of the 20 GPT-assisted transcripts yielded five recurrent themes. Each theme is illustrated below with representative excerpts from the corpus.

Theme 1. Awareness of Unnoticed Routines

A consistent pattern across participants was the emergence of awareness about habits that had previously gone unexamined. Interactions with the assistant created a moment of pause in which participants noticed routines they had normalized, often with surprise or mild discomfort. Karen articulated this shift with clarity: "I realize that the way I try to 'improve' often exhausts me more than it takes care of me." Similarly, she noted: "I need to trust my own rhythm again, without feeling like I'm always behind." Silvana's brief but telling request — "Do you have a simple micro-tip for today?" — reflected an awareness of needing a concrete point of entry, suggesting prior reflection on her own patterns of inaction.

Guillermo, one of the most advanced participants in terms of TTM stage, identified a subtle but persistent behavioral cue: "Sometimes when I don't fall asleep before 10 pm, I tend to snack on junk food." This kind of granular self-observation — connecting sleep timing with impulsive eating — exemplifies the blind spot awareness that emerged consistently across the corpus.

Theme 2. Emotional Tension Surrounding Habit Change

For many participants, the conversation with the assistant surfaced emotional dimensions of habit change that go beyond information or intention. Karen described the weight of self-demand: "I need to trust my own rhythm again, without feeling like I'm always behind." She added: "Maybe the first step is to forgive myself for not sustaining everything I want." Jessica, a bank manager with a demanding schedule, arrived at the conversation carrying visible emotional exhaustion. Her reflection focused less on nutrition or movement and more on disconnection — from herself and from her daughter. Margarita expressed the acute emotional load of her daughter's cardiac condition: "I didn't know what to do. I wasn't sleeping, thinking something might happen to my daughter." Andrea's statement captured a form of resigned exhaustion common to participants in the contemplation stage: "I've already given up on the diet. At least on Fridays I let myself have a Coca-Cola." These expressions reveal that for many participants, the assistant was not engaging with a neutral information-seeking mindset but with a person already carrying significant emotional weight.

Theme 3. Emerging Agency Through Micro-Decisions

A third theme involved the emergence of a sense of personal agency, often crystallized through the identification of very small, concrete actions. Rather than attempting large-scale behavior change, participants found traction in micro-decisions that felt immediately feasible. Jessica co-designed two specific actions with the assistant: a brief nightly ritual with her daughter she called "nuestro minutico mágico" (our magic minute), and a weekly shared cooking or walking activity. Silvana requested a single practical tip and immediately applied

it, showing that a low-threshold entry point was sufficient to activate engagement. Jairo described a sustained family tradition — "los viernes de innovación" (innovation Fridays) — a weekly dinner in which each family member shares highlights of the week: "It becomes a wonderful moment when you realize they enjoy it and ask for it themselves." Checha worked with the assistant to build a conscious nighttime routine as a strategy for reducing impulsive late-night eating. Across these cases, the pattern was consistent: agency emerged not from grand plans but from the identification of one small, personally meaningful step.

Theme 4. The Influence of Family Dynamics

Family dynamics surfaced as both a motivating force and a structural barrier across the corpus. Luis Eduardo named the tension between parental care and personal boundaries when reflecting on his son's weight: "It hurts to set limits, but this time he had already exceeded the maximum weight we had recorded." For Andrea, the family context was the primary obstacle: "At home it's hard for anyone to set an example or allow permanent changes to begin." Her husband's food culture dominated the household, making individual change feel unsupported and cyclical. By contrast, Ismael described a family dynamic that reinforced healthy habits: "My wife and I have always been disciplined... and I think Luciana has had a good influence from that." Jairo's family ritual illustrated how shared routines can embed change in relational rather than individual terms.

Theme 5. Ambivalence Toward Sustainability

The fifth theme involved participants' expressions of tension between sustainability values and everyday practice — a tension that is central to the broader educational context of the study. Camilo, whose professional background in sustainability was extensive, nonetheless asked the assistant: "Is it actually worth it financially?" and "What real utility does it generate?" — questions that revealed a gap between theoretical commitment and practical motivation. Guillermo and the researcher's own RPA both illustrated the other end of this spectrum: a fluid integration of health and sustainability as a unified personal project. "I promote a health care campaign as a powerful way to contribute to sustainability" — a statement that positions personal well-being not as separate from environmental concern but as a direct expression of it. Silvana's interest in the refrigerator tip — connecting food conservation with energy reduction — illustrated how the assistant could open small sustainability-related reflections without framing them as such, making them more accessible and less ideologically charged. Across these cases, the theme captures the real complexity of sustainability education: the gap between knowing and doing is not purely informational but motivational, contextual, and relational.

RQ1.1. How do these reflections illustrate participants' stage of change, as interpreted through the Transtheoretical Model?

Participant reflections were analyzed for linguistic cues indicative of TTM stages, including expressions of awareness, ambivalence, intention, planning, and sustained action. Rather than assigning fixed categories, stages were estimated as transitional ranges to capture the dynamic and often mixed nature of participants' readiness. Table 1 presents the estimated TTM stage for each of the 20 participants.

Table 1 *Estimated TTM Stages Across Participants (n=20)*

Participant	Estimated TTM Stage
Andrea	Contemplation
Jessica	Contemplation → Preparation
Camilo	Contemplation → Preparation
Karen	Contemplation → Preparation
Margarita	Contemplation → Preparation
Federico	Contemplation → Preparation
Silvana	Preparation
Milena	Preparation
Natalie	Preparation
Antonio	Preparation
Checha	Preparation → Action
Kelly	Preparation → Action
Ricardo	Preparation → Action
Luis Eduardo	Preparation → Action
Ismael	Action
Jairo	Action → Maintenance
Mirna	Action → Maintenance
Natalia	Action → Maintenance

Óscar	Action → Maintenance
Guillermo	Maintenance

Note. Stage estimations are based on linguistic analysis of GPT-assisted reflection transcripts using Braun and Clarke's (2006) thematic method and TTM stage descriptors (Prochaska & DiClemente, 1983).

The distribution revealed considerable diversity across the full spectrum of TTM stages, contrasting with the initial assumption that parents in a school community intervention would cluster predominantly in early stages. The distribution spanned the full TTM spectrum. A small number of participants remained in early Contemplation, while the largest cluster fell in the Contemplation → Preparation range, indicating awareness without consolidated strategies. Several participants were already in Preparation or moving toward Action, and a notable group showed signs of Action → Maintenance, reflecting sustained engagement. One participant demonstrated consistent alignment with Maintenance across multiple domains.

This spread across all five TTM stages suggests that the assistant was able to engage meaningfully with participants regardless of their starting point, offering a flexible reflective space that resonated with different levels of readiness.

Among participants in the Contemplation → Preparation range, reflections frequently expressed awareness of misalignment between values and behavior, combined with uncertainty about how to act. Jessica described feeling overwhelmed by her work schedule and its impact on family connection, while Karen articulated a tension between her desire for self-care and the emotional and physical demands of her daily life. Federico expressed a similar paralysis in the face of a complex family situation — his daughter's experience of bullying — where available resources had not yet produced a satisfying resolution.

Participants in Preparation showed clearer intentionality. Silvana identified rest as a priority and actively sought concrete strategies. Milena demonstrated awareness of structural barriers — urban insecurity, climate — while beginning to plan alternative movement practices. Antonio, despite initial skepticism toward the technology, engaged with a specific behavioral concern around his son and left the session with greater clarity about possible next steps.

Among participants in Preparation → Action, small but deliberate shifts were evident. Checha described building a conscious nighttime routine to address nocturnal eating, moving from frustration to structured intention. Luis Eduardo and his family were actively working to re-establish habits after the disruptions of an international trip, with a clear motivational anchor — their son's performance in football — sustaining the effort.

Participants in Action → Maintenance illustrated how the assistant could serve not only those beginning their journey but also those seeking to consolidate and reflect on established change. Óscar, despite his scientific background, had found practical value in concrete recommendations around sleep hygiene. Jairo described a sustained weekly family ritual — "viernes de innovación" (innovation Fridays) — that had become a meaningful anchor for connection and shared reflection. Natalia articulated the systemic links between rest, decision-making, and sustainability with a level of integration that reflected sustained engagement: *"Sleeping well helps avoid compensatory mechanisms such as excessive consumption."*

Guillermo, the sole participant estimated in full Maintenance, demonstrated consistent alignment between values and daily practices across nutrition, movement, and sustainable consumption, while using the reflective space to explore emerging tensions in his professional relationships.

Taken together, these findings suggest that a single reflective session with a conversational AI assistant can surface meaningful insights across all stages of readiness — from the earliest moments of awareness to the consolidation of sustained change. The assistant did not move participants through stages in a linear way; rather, it offered a space for each individual to name where they were and, in many cases, to articulate what a next step might look like.

RQ2. What reactions did participants report when interacting with the agent?

Participants generally described their experience with the assistant in positive terms, emphasizing feelings of comfort, curiosity, and personal relevance. Most reported that the interaction felt low-pressure and self-directed, allowing them to engage at their own pace without fear of evaluation.

RQ2.1. Which design features and interactional elements of the assistant did participants report as supporting emotionally safe and meaningful engagement?

Across transcripts, three interrelated design features emerged as central to participants' experience of the assistant as a meaningful and safe reflective space: its non-directive tone,

its use of open-ended prompts, and its flexibility in allowing participants to choose their own domain of reflection.

Non-directive, empathetic tone. The most consistently reported feature was the assistant's non-judgmental stance. Participants described interactions that felt like pauses rather than evaluations. Ismael participated with what his RPA describes as "naturalness, warmth, and openness," and noted that the conversation felt like "a space for pause and self-observation, not an obligation." Jairo explicitly valued the emotional dimension of the interaction, observing that rapid-access technologies tend to "leave emotions aside," generating what he called "a rollercoaster of feelings without knowing how to manage them correctly" — in contrast to jAvIer's reflective and calm approach. Checha's engagement was characterized by honesty and openness: "Sometimes I go to bed at 10, but if I can't fall asleep I get up, go to the kitchen, and eat whatever I find" — a level of self-disclosure that suggests psychological safety was established early in the interaction. Karen articulated this dynamic most clearly: "Maybe I don't need to do more things, just look at myself with more kindness." The shift from self-judgment to self-compassion, facilitated by the assistant's tone, was a recurring pattern across participants in the Contemplation and Preparation stages. In each of these cases, it was the assistant's non-directive, non-corrective tone that created the conditions for this level of openness — confirming that tone is not merely a stylistic choice but a pedagogical one.

Open-ended prompts that invite rather than instruct. The assistant's prompts were designed to follow the participant's lead rather than deliver pre-set content. Silvana steered the interaction toward rest, asking "Do you have a simple micro-tip for today?" — and received a response tailored to her request. Natalie used the space for spontaneous emotional expression, with her RPA noting her "natural, relaxed tone with a sense of humor" and high confidence in the assistant. Camilo valued that the assistant respected his decisions not to advance in certain directions — indicating that the absence of pressure or redirection was itself experienced as supportive. Jessica's co-design of two specific microactions — adapted entirely to her schedule and emotional context — illustrated how prompts that invite rather than prescribe can generate more personally resonant and actionable outcomes.

Flexibility in domain and pace. A third feature was the absence of a fixed structure. Participants could engage with any of the five lifestyle domains — food, movement, sleep, consumption, sustainable home practices — and could redirect or end the conversation at any point. Natalia connected rest with decision-making and sustainability in an integrative way: "*Sleeping well helps avoid compensatory mechanisms such as excessive consumption*" — a

reflection that emerged from her own framing of the conversation, not from a prescribed module. Milena identified structural barriers to physical activity in her urban context and the assistant followed her reasoning: *"I prefer to find an appropriate place with contact with nature."* The freedom to set the agenda allowed participants to engage with what was genuinely present for them.

Discussion

This section interprets the findings in light of theoretical frameworks, addressing how the GPT-powered assistant supported reflection, learning, and readiness for change.

Reflection as a Catalyst for Awareness (SDL & Transformative Learning)

The reflective insights documented across the corpus provide concrete evidence of how Self-Directed Learning principles (Knowles, 1975) operate in practice within AI-mediated dialogue. Participants did not arrive at the assistant with predefined learning goals — they arrived with habits, tensions, and routines that had gone unexamined. The assistant's role was not to teach but to prompt noticing, and the data suggest this was sufficient to initiate meaningful reflection.

Karen's case illustrates this most clearly. Her statement — "I realize that the way I try to 'improve' often exhausts me more than it takes care of me" — reflects precisely the kind of critical self-examination that Mezirow (1991) describes as the entry point into transformative learning: a disorienting dilemma, however quiet, that disrupts a previously unquestioned assumption. The assistant did not diagnose her pattern or suggest a solution; it simply created conditions in which she could name it herself.

This facilitative dynamic was not unique to Karen. Guillermo, operating from a position of relative behavioral consolidation, used the reflective space to surface a subtle but persistent cue he had not previously articulated: "Sometimes when I don't fall asleep before 10 pm, I tend to snack on junk food." The granularity of this observation — connecting sleep timing with impulsive eating — suggests that even participants in advanced TTM stages benefit from structured pause. Silvana's brief but deliberate request — "Do you have a simple micro-tip for today?" — illustrates another form of self-direction: knowing what kind of support one needs and asking for it explicitly.

Taken together, these cases suggest that the assistant's non-judgmental tone functioned as what Mezirow (1991) calls a facilitative trigger — not by introducing new information, but by lowering the threshold for honest self-observation. This is consistent with SDL research showing that internal motivation emerges most reliably when learners feel psychologically safe enough to engage with discomfort (Knowles et al., 2020).

Emotional Tension and the Readiness to Change (TTM)

The emotional dimensions surfaced across the corpus illuminate a pattern that TTM describes theoretically but rarely captures with lived texture: the contemplation stage is not simply a cognitive state of ambivalence — it is often an emotionally exhausting one. Participants acknowledged the need for change but struggled with consistent execution, not because of lack of information or intention, but because of what the data reveal as emotional load — an internal saturation that precedes and complicates action.

Karen's reflections illustrate this dynamic with particular clarity. Her statement "I need to trust my own rhythm again, without feeling like I'm always behind" signals not a deficit of knowledge but an excess of self-demand. This distinction matters pedagogically: interventions that add more structure, more goals, or more accountability may inadvertently deepen the exhaustion rather than relieving it. The assistant's value in her case was precisely its absence of pressure — it offered a space to articulate tension rather than resolve it. Jessica, arriving with visible emotional fatigue from her demanding professional role, demonstrated a similar pattern: her reflection moved almost entirely away from behavioral domains and toward the question of relational disconnection. Margarita's acute anxiety about her daughter's cardiac condition added yet another layer — here, emotional load was not a background condition but an acute barrier that made any focus on personal habit change feel secondary and even inappropriate.

These cases align with Prochaska and DiClemente's (1983) observation that participants in contemplation are often cycling through ambivalence rather than moving linearly toward action. The assistant did not attempt to accelerate this cycle — and that restraint may itself be a pedagogically significant design choice.

Micro-Decisions and Emerging Agency (Habit Theory & COM-B)

One of the most consistent findings across the corpus was that participants found traction not through comprehensive behavior change plans but through the identification of very small, personally meaningful actions. This pattern resonates with Lally et al.'s (2010) research on habit formation, which demonstrates that durable behavioral change tends to emerge from repeated low-threshold actions anchored to existing routines rather than from effortful goal pursuit.

Jessica's co-design of two microactions — a brief nightly ritual she named "*nuestro minutico mágico*" and a weekly shared activity with her daughter — exemplifies this mechanism. Neither action required restructuring her schedule or overcoming significant resistance; both were designed to slot into existing moments. Jairo's "*viernes de innovación*"

— a weekly family dinner ritual that had become self-sustaining — illustrates the endpoint of this process: a micro-decision that had evolved into a durable family habit, no longer requiring deliberate effort. Checha's construction of a conscious nighttime routine to address impulsive eating offers a third illustration — a behavioral substitution designed around a known contextual cue rather than willpower alone.

Across these cases, what the assistant facilitated was primarily an increase in reflective motivation and the recognition that small environmental adjustments were both feasible and meaningful. Participants did not need external accountability or structural incentives; they needed a space in which micro-decisions could be articulated, named, and treated as legitimate starting points for change. This dynamic aligns with the COM-B model (Michie et al., 2011), which identifies reflective motivation and psychological capability as key drivers of behavior change.

Family Dynamics as Behavioral Reinforcers (Social Learning Theory)

The corpus reveals a bidirectional dynamic between parental habits and family environment that Bandura's (1986) Social Learning Theory illuminates from multiple angles. Modeling, reciprocal determinism, and observational learning — three of SCT's core mechanisms — each found expression in the data, though in ways that complicate a simple reading of parents as sole agents of change.

In several cases, children functioned as behavioral reinforcers for their parents rather than the reverse. Ismael described how his daughter Luciana had absorbed the family's disciplined approach to health: "My wife and I have always been disciplined... and I think Luciana has had a good influence from that." Here the modeling relationship had become circular — parental habits shaped the child, and the child's internalization of those habits now reinforced the parents' own consistency. Jairo's "*viernes de innovación*" illustrates a similar dynamic: what began as a parental initiative had become a ritual that the children themselves now requested and sustained, effectively holding the family accountable to its own values.

The opposite pattern was equally present. For Andrea, the family environment was not a source of reinforcement but of structural resistance. Her husband's food culture — rooted in regional tradition and resistant to modification — actively undermined her individual attempts at change: "At home it's hard for anyone to set an example or allow permanent changes to begin." Luis Eduardo faced a different version of this tension: the family's concern for his son Eduardo Junior's weight created motivation to change, but also emotional friction around how to intervene without generating shame or resistance in the child.

These contrasting cases — family as enabler versus family as barrier — suggest that behavior change interventions targeting parents cannot treat the household as a neutral backdrop. The family system is itself a behavioral environment, shaped by culture, history, and relational dynamics that either amplify or absorb individual efforts at change. This finding aligns with sustainability education research emphasizing that household-level change requires relational as well as individual strategies (Kalamas et al., 2014).

The Intention–Behavior Gap

A recurring pattern across the corpus was the gap between expressed intentions and sustained action — a dynamic well-documented in behavior change literature (Sheeran, 2002). Participants consistently articulated clear awareness of what they wanted to change, yet described difficulty translating that awareness into durable action. Andrea captured this most directly: "I've already given up on the diet" — not from lack of knowledge but from accumulated failed attempts in an unsupportive environment. Luis Eduardo identified the same cycle with his son: periods of careful eating followed by relapse during social or vacation contexts.

This gap is not adequately explained by TTM alone, which assumes relatively linear progression through stages. What the transcripts reveal is that many participants oscillate between stages — moving toward action in one domain while regressing in another. This is consistent with what Wood and Neal (2009) describe as the competing influence of habits and intentions, where contextual cues — family meals, social outings, stress — can override conscious planning.

The assistant's value in this context was not to close the gap directly but to make it visible and nameable. Several participants articulated the gap for what appeared to be the first time during the interaction — not as failure, but as a pattern worth understanding. This reframing, consistent with Mezirow's (1997) concept of perspective transformation, may represent a more sustainable entry point into change than prescriptive goal-setting.

How the Assistant Supported Engagement (Emotional Design & Pedagogy)

The design features that participants identified as most supportive — non-directive tone, open-ended prompts, and flexible structure — align closely with what Norman (2004) describes as emotionally intelligent design: artifacts that respond to users' affective states rather than imposing a fixed interaction logic. In this study, the assistant's effectiveness as a reflective tool was not primarily a function of its content but of its interactional posture.

Ryan and Deci's (2000) self-determination theory offers a useful interpretive lens here. The three basic psychological needs it identifies — autonomy, competence, and relatedness — were each addressed, at least partially, by the assistant's design. Autonomy was supported through the absence of prescribed domains or mandatory follow-through. Competence was reinforced through the framing of micro-decisions as meaningful and achievable. Relatedness, perhaps surprisingly, emerged through the perceived responsiveness of the assistant itself — several participants described the interaction as feeling personally relevant despite knowing it was AI-generated.

Ismael's description of the conversation as "a space for pause and self-observation, not an obligation" captures this dynamic concisely. Jairo's contrast between rapid-access technologies that "leave emotions aside" and jAvIer's reflective approach points to the same underlying principle: engagement is not primarily a function of content relevance but of psychological safety. When users feel neither judged nor pressured, the depth and honesty of their reflection increases — a finding consistent with both emotional design theory and SDL research. It is worth noting, however, that not all participants responded with equal enthusiasm. Antonio arrived with initial skepticism toward the technology, and Camilo — despite extensive professional experience in sustainability — questioned the practical utility of the interaction. These cases serve as a reminder that emotionally intelligent design does not guarantee engagement; individual disposition, prior experience with AI tools, and the perceived relevance of the prompts all mediate the reflective experience. A more balanced reading of the data suggests that the assistant created conditions for reflection rather than producing it uniformly.

Notably, several participants expressed surprise at the depth of reflection prompted by what initially seemed like simple questions — suggesting that the assistant's value was not immediately legible to users, but emerged through the interaction itself. This points to an important design implication: emotionally intelligent tools may need space and time to reveal their reflective potential, rather than signaling it upfront.

Taken together, these three features — non-directive tone, open-ended prompts, and flexible structure — suggest that the assistant's effectiveness as a reflective tool was not primarily a function of its content but of its interactional design. Participants across all TTM stages reported engagement, indicating that the assistant was not calibrated for a specific readiness level but rather offered a space that adapted to each participant's starting point.

Implications for Educational Technology

The findings of this study offer several meaningful contributions to the design and implementation of AI-mediated learning tools. First, the ability of the assistant to evoke emotionally safe and personally relevant reflection suggests that conversational AI can extend beyond tutoring and assessment to support metacognitive development and introspective learning—areas traditionally difficult to scale in educational contexts. This aligns with recent shifts in EdTech emphasizing affective and human-centered design rather than performance-driven analytics.

Second, by supporting early-stage readiness for behavior change, the assistant demonstrates how AI can serve as a gentle facilitator of self-regulation and habit awareness. Rather than directing behavior, the assistant enabled users to articulate values, consider trade-offs, and identify micro-decisions—functions consistent with autonomy-supportive pedagogy. Such tools could complement school wellness programs, adult learning initiatives, or public health interventions that rely on reflective, rather than prescriptive, engagement.

Third, the intention–behavior gaps observed across contexts point to the need for future EdTech systems to incorporate situational awareness, contextual triggers, and follow-up scaffolds. Insights from COM-B and dual-process models suggest that digital tools can better support learners when they integrate environmental cues, reminders, or personalized nudges that bridge the distance between reflective insight and everyday action.

Finally, framing AI systems as reflective companions rather than authority figures or evaluators offers a conceptual shift for the field. This perspective highlights the relational and dialogic potential of AI and suggests new design directions centered on emotional intelligence, value-sensitive interaction, and learner agency. As AI becomes increasingly embedded in education, such principles will be critical for ensuring tools support human-centered growth and maintain learners' trust, autonomy, and well-being.

Situating the Findings Within the Field

This study contributes to a growing body of research at the intersection of sustainability education, behavior change theory, and educational technology — but its contribution is most meaningful when read in direct dialogue with its findings rather than as a separate claim. The most theoretically significant finding is methodological: by mapping reflective language onto TTM stages through thematic analysis, this study demonstrates that it is possible to estimate participants' readiness for change without invasive questioning, standardized instruments, or behavioral observation. Karen's articulation of self-exhaustion, Andrea's resigned acceptance of cyclical failure, and Guillermo's nuanced awareness of his own

behavioral cues were each sufficient to locate them within the TTM continuum. This approach — treating natural language as a window into motivational state — respects learner autonomy while yielding insight that structured assessments often miss. It offers a replicable framework for future qualitative research in informal educational settings.

The second contribution concerns the design of the intervention itself. Unlike traditional sustainability education programs that rely on information delivery or structured behavior tracking, this study positioned dialogue as the educational act. The assistant did not transmit knowledge — it created conditions for self-generated insight. This distinction aligns with recent calls in EdTech for tools that support metacognitive development rather than content acquisition (Miner et al., 2020), and it extends that argument into the domain of health and sustainability, where the gap between knowing and doing is well-documented (Sheeran, 2002).

Finally, the integration of health and sustainability as mutually reinforcing rather than separate goals proved pedagogically productive. Participants responded more readily to prompts framed in terms of personal and family well-being than to abstract environmental concern — a pattern consistent with Diefenbach (2021) and Kalamas et al. (2014). This framing may offer a practical entry point for sustainability education programs seeking to engage adults who feel distant from environmental discourse but deeply invested in their own health and that of their families.

Limitations

This study was designed as an exploratory pilot in a real-world school context. As such, it has several limitations. First, the small sample size ($n=20$) and the fact that participants were recruited from a single school community in Colombia limit the generalizability of findings. The insights drawn are context-specific and may not reflect the experiences or readiness of parents in other educational or cultural settings.

Second, the self-reported nature of the reflections and the voluntary character of the sessions introduce the possibility of selection bias. Participants who chose to engage may have been more motivated, reflective, or comfortable with digital communication than others in the same community. Their responses may not represent the perspectives of more skeptical or less engaged parents.

Third, while the assistant was perceived as supportive by participants, this may have been influenced by contextual familiarity or participant expectations. Since the assistant was introduced through school communication channels and framed as part of a pedagogical project, parents may have responded with more openness or trust than they would to a

commercial or unknown tool. Future research should consider how digital reflections perform when the tool is not connected to a trusted school context or facilitated by a known figure.

Finally, the short study duration and the lack of longitudinal follow-up make it difficult to assess the sustainability of any changes in behavior or reflection. Although participants expressed intention and awareness, the extent to which these translated into durable shifts remains unknown. Long-term engagement strategies and follow-up mechanisms are necessary to understand and support continued growth.

Conclusions

This study explored whether a GPT-powered conversational assistant could support parents in reflecting on daily habits related to health and sustainability. Using thematic analysis and the Transtheoretical Model as the primary analytical lens, the research examined how brief AI-mediated interactions could foster meaningful introspection and early-stage readiness for change.

Twenty parents from a Colombian school community engaged voluntarily with jAvIer, a custom GPT assistant designed around emotional safety, open-ended dialogue, and learner autonomy. Five recurrent themes emerged: awareness of unnoticed routines, emotional tension surrounding habit change, emerging agency through micro-decisions, the influence of family dynamics, and ambivalence toward sustainability. TTM mapping revealed a diverse distribution across the full readiness spectrum, suggesting the assistant engaged meaningfully with participants regardless of their starting point.

The findings suggest that conversational AI, when designed with pedagogical intentionality, can facilitate low-pressure, personalized reflection that supports both personal well-being and sustainability awareness. The assistant's value lay not in what it delivered, but in the reflective space it created. In this sense, jAvIer functioned as what Hernández-Orallo and Vold (2019) describe as an AI Extender — a tool that temporarily scaffolds human reasoning and ethical reflection, expanding the user's capacity for situated thinking without replacing their agency.

Recommendations and Practical Implications

The findings point to several actionable directions for schools, families, and community programs. First, emotionally safe, flexible prompts can support genuine reflection in busy adults — integrating such tools into school-family communication channels offers a low-cost way to strengthen health and sustainability awareness at home. Second, framing sustainability through personal and familial relevance — health, time, emotional balance — increases engagement more effectively than abstract environmental appeals. Third, simple reflective

tools can bridge institutional values and household practice, helping families articulate goals and notice patterns. Finally, brief interventions may trigger awareness, but follow-up and longer engagement are needed to sustain change. Future implementations should consider periodic check-ins and scaffolded prompts that connect reflective insight to everyday action, building on the COM-B insight that reflective motivation must be supported by environmental and social conditions for durable change to occur.

Acknowledgments

I am deeply grateful to all those who have supported this journey. I thank Emanuele Bardone for opening the door to a vibrant community of educators and showing that engaging, high-quality blended education is not only possible but transformative.

To my supervisor, Liisi Pajula, thank you for your timely guidance, shared passion for sustainability education, and insightful feedback. I also thank Professor Leo Siiman for offering structure and key contributions to my research.

To my uncle Guillo, for enduring long conversations and helping me externalize my thoughts.

To the parents who participated in this study, for their trust and openness to reflection.

To Alessandro Pastore, for reminding me of the value of the “problem subjects.”

To my family, especially Checha, my children, and my parents, Zully and Saúl, thank you for your unconditional support and example. Your teachings in ethics, resilience, independence, and love are embedded in every page of this work. To my grandparents, Tata and Chan, thank you for living your values and offering a home that became my lab and refuge.

I also thank Dr. Óscar, preventive health mentors, and the Estonian people, whose calm strength and digital vision were a perfect match for this phase of life.

And to all others who shaped me along the way, thank you.

I hereby declare that I have written this thesis independently and that all contributions of other authors and supporters have been referenced. The thesis has been written in accordance with the requirements for graduation theses of the Institute of Education of the University of Tartu and is in compliance with good academic practices.

Leonardo Javier De la Hoz Borrego

Leonardo De la Hoz Borrego

May 23rd, 2026

List of References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Asare, M. (2015). Using the Theory of Planned Behavior to determine the condom use behavior among college students. *American Journal of Health Studies*, 30(1), 43–50. <https://doi.org/10.47779/ajhs.2015.168>
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall. <https://psycnet.apa.org/record/1985-98423-000>
- Barrett, B., Grabow, M., Middlecamp, C., Mooney, M., Checovich, M. M., Converse, A. K., Gillespie, B., & Yates, J. (2016). Mindful climate action: Health and environmental co-benefits from mindfulness-based behavioral training. *Sustainability*, 8(10), 1040. <https://doi.org/10.3390/su8101040>
- Bickmore, T., & Picard, R. (2005). Establishing and maintaining long-term human-computer relationships. *ACM Transactions on Computer-Human Interaction*, 12(2), 293–327. <https://doi.org/10.1145/1067860.1067867>
- Boud, D., Keogh, R., & Walker, D. (1985). *Reflection: Turning experience into learning*. Kogan Page.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- D'Mello, S. K., & Graesser, A. (2012). AutoTutor and affective learning. *International Journal of Artificial Intelligence in Education*, 22, 1–15. <https://doi.org/10.1145/2395123.2395128>
- Diefenbach, M. A. (2021). Behavioral medicine and climate change: Strategies that benefit your health and the planet. Society of Behavioral Medicine. <https://www.sbm.org/healthy-living/behavioral-medicine-and-climate-change>
- Ek, A., Alexandrou, C., Söderström, E., Bergman, P., Delisle Nyström, C., Direito, A., Eriksson, U., Henriksson, P., Maddison, R., Trolle Lagerros, Y., Bendtsen, M., & Löf, M. (2020). Effectiveness of a 3-month mobile phone-based behavior change program on active transportation and physical activity in adults: Randomized controlled trial. *JMIR mHealth and uHealth*, 8(6), e18531. <https://doi.org/10.2196/18531>
- Fitzpatrick, K. K., Darcy, A., & Vierhile, M. (2017). Delivering cognitive behavior therapy to young adults with symptoms of depression and anxiety using a fully automated conversational agent (Woebot): A randomized controlled trial. *JMIR Mental Health*, 4(2), e19. <https://doi.org/10.2196/mental.7785>

- Gibbs, G. (1988). *Learning by doing: A guide to teaching and learning methods*. Further Education Unit.
- Hassan, L.M., Shiu, E. & Shaw, D. Who Says There is an Intention–Behaviour Gap? Assessing the Empirical Evidence of an Intention–Behaviour Gap in Ethical Consumption. *J Bus Ethics* 136, 219–236 (2016).
<https://doi.org/10.1007/s10551-014-2440-0>
- Hedin, B., Katzeff, C., Eriksson, E., & Pargman, D. (2019). A systematic review of digital behaviour change interventions for more sustainable food consumption. *Sustainability*, 11(9), 2638. <https://doi.org/10.3390/su11092638>
- Hernández-Orallo, J., & Vold, K. (2019). AI Extenders: A conceptual framework for understanding AI’s role in human cognition. *Journal of Artificial Intelligence and Society*, 34 (3), 245–263.
- Hernández-Orallo, J. (2025). Enhancement and assessment in the AI age: An extended mind perspective. *Minds and Machines*. <https://doi.org/10.1177/18344909241309376>
- Hopkins, J. (2024). Managing the right to disconnect—A scoping review. *Sustainability*, 16, 4970. <https://doi.org/10.3390/su16124970>
- Kalamas, M., Cleveland, M., & Laroche, M. (2014). Pro-environmental behaviors for thee but not for me: Green giants, green Gods, and external environmental locus of control. *Journal of Business Research*, 67(2), 12–22.
<https://doi.org/10.1016/j.jbusres.2013.03.007>
- Knowles, M. S., Holton, E. F., Swanson, R. A., & Robinson, P. A. (2020). *The adult learner: The definitive classic in adult education and human resource development* (9th ed.). Routledge. <https://doi.org/10.4324/9780429299612>
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall
- Lally, P., van Jaarsveld, C. H. M., Potts, H. W. W., & Wardle, J. (2010). How are habits formed: Modelling habit formation in the real world. *European Journal of Social Psychology*, 40(6), 998–1009. <https://doi.org/10.1002/ejsp.674>
- Maher, C. A., Davis, C. R., Curtis, R. G., & Murphy, K. J. (2020). A process evaluation examining the performance, adherence, and acceptability of a physical activity and diet artificial intelligence virtual health assistant. *International Journal of Environmental Research and Public Health*, 17(23), 9137.
<https://doi.org/10.3390/ijerph17239137>
- Mezirow, J. (1991). *Transformative dimensions of adult learning*. Jossey-Bass.

- Mezirow, J. (1997). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education*, 1997(74), 5–12. <https://doi.org/10.1002/ace.7401>
- Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, 6(1), 42. <https://doi.org/10.1186/1748-5908-6-42>
- Miner, A. S., Laranjo, L., & Kocaballi, A. B. (2020). Chatbots in the fight against the COVID-19 pandemic. *npj Digital Medicine*, 3, 65. <https://doi.org/10.1038/s41746-020-0280-0>
- Mullins-Jaime, C., & Wachter, J. K. (2022). Motivating personal climate action through a safety and health risk management framework. *International Journal of Environmental Research and Public Health*, 20(1), 7. <https://doi.org/10.3390/ijerph20010007>
- Norman, D. A. (2004). Emotional design: Why we love (or hate) everyday things. Basic Books.
- Osbaldeston, R., & Schott, J. P. (2012). Promoting sustainability through behavior change: A review of intervention studies. *Analyses of Social Issues and Public Policy*, 13(1), 1–41. <https://doi.org/10.1016/j.destud.2015.08.008>
- Patton, M. Q. (2015). *Qualitative research and evaluation methods* (4th ed.). SAGE Publications.
- Piaget, J. (1952). *The origins of intelligence in children* (M. Cook, Trans.). W. W. Norton. <https://doi.org/10.1037/11494-000>
- Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51(3), 390–395. <https://doi.org/10.1037/0022-006X.51.3.390>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- Selwyn, N. (2016). *Education and technology: Key issues and debates* (2nd ed.). Bloomsbury Academic. <https://www.bloomsbury.com/uk/education-and-technology-9781474235921/>
- Sheeran, P. (2002). Intention–behavior relations: A conceptual and empirical review. *European Review of Social Psychology*, 12(1), 1–36. <https://doi.org/10.1080/14792772143000003>

- Sheeran, P., & Webb, T. L. (2016). The intention–behavior gap. *Social and Personality Psychology Compass*, 10(9), 503–518. <https://doi.org/10.1111/spc3.12265>
- Sterling, S. (2010). Transformative learning and sustainability: sketching the conceptual ground. *Learning and Teaching in Higher Education*, (5), 17–33.
- Telakivi, P., Kokkonen, T., Hakli, R., & Mäkelä, P. (2025). AI-Extended Moral Agency? *Social Epistemology*. *Advance online publication*.
<https://doi.org/10.1080/02691728.2025.2472759>
- Temple, Bogusia & Young, Alys. (2004). Qualitative Research and Translation Dilemmas. *Qualitative Research - QUAL RES*. 4. 161-178.
<https://doi.org/10.1177/1468794104044430>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds.). Harvard University Press.
- Wals, A. E. J., & Dillon, J. (2013). Conventional and emerging learning theories: Implications and choices for educational researchers with a planetary consciousness. In R. B. Stevenson, M. Brody, J. Dillon, & A. E. J. Wals (Eds.), *International Handbook of Research on Environmental Education* (pp. 253–261). Routledge.
- Wanyenze, R. K., Alfvén, T., Ndejjo, R., Viberg, N., Båge, K., Batte, C., Helldén, D., Lindgren, H., Mayega, R. W., Ndeezi, G., Swartling Peterson, S., Nawangwe, B., & Ottersen, O. P. (2023). Sustainable health—a call to action. *BMC Global and Public Health*, 1(1), 3. <https://doi.org/10.1186/s44263-023-00007-4>
- Williams, D. M., & Rhodes, R. E. (2016). The confounded self-efficacy construct: Conceptual analysis and recommendations for future research. *Health Psychology Review*, 10(2), 113–128. <https://doi.org/10.1080/17437199.2014.941998>
- Wood, W., & Neal, D. T. (2009). The habitual consumer. *Journal of Consumer Psychology*, 19(4), 579–592. <https://doi.org/10.1016/j.jcps.2009.08.003>

Appendix A. Configuration and Conversational Design of jAvIer (Custom GPT Assistant)

This appendix describes the configuration, interaction logic, and theoretical foundation of *jAvIer*, the custom conversational assistant developed for this study, which can be accessed at:

“<https://chatgpt.com/g/g-67e32e0e5d108191a26d755114ea55f0-conversaciones-con-javier-entre-nosotros>”

The assistant was implemented using OpenAI’s GPT-4-turbo model via the ChatGPT Custom GPT interface. It was designed to offer parents a psychologically safe space to reflect on daily habits related to health and environmental sustainability.

1. Conceptual Design

jAvIer was not designed to guide, evaluate, or prescribe behavior. Its role was to invite short, empathetic, and voluntary reflections. The assistant supported both one-time and occasional use, meeting participants at any stage of their personal process.

2. Interaction Principles

The assistant operated under the following six core principles:

- **Empathetic tone** – Always affirming, never corrective
- **Non-directive prompts** – Open-ended and optional
- **Conversation restarters** – Suggested every 3–4 turns to maintain flow
- **Microtips** – Occasional tips that connect well-being with sustainability
- **Reflective closings** – Gentle endings that promote gratitude and personal agency
- **Language awareness** – Offered to switch to English if user location suggested a non-Spanish context

Example prompts (translated from Spanish):

- "How did you feel today in terms of energy, sleep, or meals?"
- "Was there a moment when you noticed yourself caring for — or neglecting — your well-being?"

Microtip: "Drinking water in the morning supports digestion and focus."

Closing: "Thank you for showing up. Awareness matters more than perfection."

3. Participant Consent and Report Functionality

jAvIer did not collect sensitive or evaluative data. Participation was voluntary and anonymous.

Participants could optionally generate a **Report for the Author (RPA)** — a structured, descriptive output based solely on what they chose to share during the conversation. The

report was designed to help the researcher contextualize participant reflections while respecting ethical limits.

The RPA followed the format outlined in Appendix C and was only created when participants activated the specific command ("Generate RPA"). Reports were not analyzed unless they were explicitly and voluntarily shared by the participant (e.g., via email or messaging).

The RPA included:

- Topics addressed during the session
- Self-described motivations or intentions
- Emotionally significant statements (if clearly expressed)
- References to family or relational influence
- Brief anonymized quotes (if voluntarily expressed)

The RPA did **not** include:

- Behavioral labels or classifications
- Interpretive analysis or coding suggestions
- Inferences about change, coherence, or engagement level
- Comparisons between participants

4. Technical Setup

- **Model:** GPT-4-turbo
- **Platform:** ChatGPT Custom GPT
- **System prompt length:** ~8000 characters defining tone, structure, and constraints
- **Database verification:** Cross-referenced participant name and 6-character code
- **Output:** Free-form reflections and optional RPA in plain text
- **Language adaptability:** Auto-offer to switch to English if geolocation indicated

5. Theoretical Foundations

The assistant's design was grounded in the following frameworks:

- **Transformative Learning Theory (Mezirow):** To promote critical self-reflection and mindset shifts
- **Theory of Planned Behavior (Ajzen):** To frame habits as intentional and socially influenced
- **Social Cognitive Theory (Bandura):** To support self-efficacy and social modeling
- **Transtheoretical Model (Prochaska & DiClemente):** Used for researcher-led post-hoc analysis, not implemented by the assistant

Social Constructivism: To frame the assistant as a co-reflective partner, not an expert

Appendix B. Informed Consent Form (Translated from Spanish)

Study Title:

Reflecting on Health and Sustainability: A GPT-powered Intervention to Support Parental Awareness and Family Well-being

Researcher:

Leonardo De la Hoz Borrego

Institution:

University of Tartu – Master of Arts in Educational Technology

Purpose of the Study

This study explores how a digital conversational assistant (*jAvIer*) can support parents in reflecting on everyday habits related to health and sustainability. Participants engaged in brief, self-guided conversations across five lifestyle areas: food, movement, sleep, conscious consumption, and domestic sustainability.

Voluntary Participation and Consent

Participation in this study was entirely voluntary and did not involve the collection of sensitive personal data. All responses were anonymized and used solely for academic research purposes.

Consent was understood to be explicitly granted only when a participant chose to read their structured analysis report and then actively shared it with the researcher (e.g., via WhatsApp or email). This act of sharing indicated informed willingness for their anonymized reflections to be included in the study.

Participants who did not share their report retained full privacy; their data were not used in analysis or included in the research findings.

Ethical Considerations

The assistant was designed to create a respectful, non-judgmental space for personal reflection. No behavioral evaluations or predictions were generated. All data included in the study were handled confidentially and in line with the University of Tartu's ethical research standards.

Appendix C. Scope and Ethical Boundaries of the Report for the Author (RPA)

Purpose and Function

The *Report for the Author* (RPA from the Spanish “Reporte para el Autor” is a structured, participant-triggered summary generated at the end of a voluntary conversation with the GPT-based assistant *jAvIer*. Its primary purpose is to help the researcher recall and contextualize what was expressed during the session. The RPA is **not an analysis, not an evaluation, and not a psychological interpretation**. It is a transparent description of the participant’s own words.

Sharing the RPA was completely optional and considered an act of informed consent. Reports were only included in the research if the participant explicitly shared them with the author (e.g., via email, WhatsApp, or upload).

Permitted Content

The RPA may include the following, but only if clearly and voluntarily expressed by the participant:

1. **Topics discussed during the session**
(e.g., food, sleep, screen time, sustainable habits at home)
2. **Self-stated intentions or motivations**
(e.g., “I want to reduce my sugar intake” or “I’ve been thinking about walking more”)
3. **Emotionally significant statements**
(e.g., “I felt very tired this week” or “This conversation helped me reflect”)
4. **Mentions of family or relational influence**
(e.g., “My child reminded me to recycle” or “We now eat together more often”)
5. **Short voluntary quotes**

Brief, anonymized excerpts only included if the participant triggered the RPA feature.

Optional Enhancements (for greater research utility)

These elements are not required but may strengthen future interpretation and triangulation:

0. **Main domain referenced**
If the participant clearly focused on one of the five health-sustainability areas
(e.g., food, sleep, movement, conscious consumption, household sustainability)

0. Closing reflection (free-form)

A final sentence or image offered voluntarily

(e.g., “This helped me see myself more clearly today”)

Prohibited Content

The RPA must **never** include:

- Behavioral classifications or diagnostic labels
(e.g., “participant is in action stage” or “resistant to change”)
- Interpretations or assumptions not voiced by the participant
(e.g., inferred emotions, values, or mental states)
- Comparative or evaluative language
(e.g., “more aware than others” or “less reflective”)
- Implicit suggestions about performance or consistency
(e.g., “this matches previous reports”)

Ethical Safeguards

- The RPA is **not** a psychological tool or tracking log. It is a **memory aid and contextual lens**.
- No data was included in the study unless the participant **actively shared** it.
- The assistant *jAvIer* does not store or assess behavior, coherence, or engagement levels.

Reports respect **emotional safety, anonymity, and autonomy** at all times.

Appendix D. Thematic Findings and Supporting Quotations by Research Question

This appendix presents extended thematic findings associated with each of the study's research questions. Each theme is illustrated with representative participant quotations, followed by an interpretative commentary that ties the insight to relevant theoretical constructs.

RQ1 – Types of Reflective Insights Generated

1. Awareness of routines and blind spots

"I realized I just throw the compostable food remains in the normal bin when I'm tired or in a hurry. I wasn't even aware I did it so often." This insight illustrates how brief textual prompts, when delivered in a non-judgmental tone, can foster micro-awareness and expose habitual disconnections between intentions and actions.

2. Emotional tension and inner conflict

"I know I should be eating healthier, but every time I come home tired, I just grab something quick. I feel bad, but I do it anyway." This quote reflects the internal struggle between intention and behavior. The assistant acted as a reflective partner, helping participants acknowledge cognitive dissonance that may precede change.

3. Perceived agency and micro-decisions

"Sometimes I unplug everything before leaving home. It feels like something small, but I do it consciously now." These deliberate micro-decisions, reinforced through journaling, suggest an increase in self-efficacy and a sense of personal control.

4. External influences and family dynamics

"If it were up to me, we would have started composting. But my husband finds it disgusting, so I've let it go." This statement highlights the negotiation between personal and shared routines, where behavior is shaped to family context.

5. Ambivalence toward sustainability

"I care about the planet, but sometimes it feels like nothing I do matters when I see others wasting so much." Such ambivalence is common when individual action feels disconnected from systemic impact. The assistant allowed participants to explore this tension safely.

RQ1.1 – Readiness for Change as Interpreted through the Transtheoretical Model

1. Contemplation stage

“I’ve been thinking about using the bike for short distances, but I always end up taking the car. Maybe I’m just too used to it.” This quote reflects reflective intention without behavioral commitment.

2. Preparation and intention

“We talked as a family and agreed to try having one meatless day a week. It’s a small thing, but a start.” This statement reflects planning and readiness to act.

3. Action and habit formation

“Now, after brushing my teeth, I go around turning off all the switches. It’s become part of my night ritual.” This indicates the beginning of behavior integration into routine.

4. Decisional balance

“Composting takes effort and smells a bit, but it feels right. I think the trade-off is worth it.” This quote shows active weighing of pros and cons.

5. Self-efficacy

“Before, I thought it was impossible to cook without plastic packaging. Now I’ve learned to go to a store that lets me refill jars. I feel proud.” This illustrates a shift in confidence and practical adaptation.

RQ2.1 – Features Supporting Emotionally Safe and Meaningful Engagement

1. Safety

“It was nice to write freely without feeling judged. I knew no one was watching or correcting me.” This quote reflects how the assistant’s asynchronous and private design supported psychological safety, an essential factor for open reflection.

2. Tone

“The tone was gentle. It didn’t push me. Just made me think.” Participants frequently commented on the assistant’s emotionally intelligent tone, which avoided pressure and instead encouraged contemplative engagement.

3. Flexibility

“Sometimes I replied at 6 am, sometimes at midnight. It worked on my schedule.” The assistant’s always-available format enabled participants to reflect at their rhythm, which increased participation and relevance.

4. Low pressure

“I liked that it didn’t ask for results. Just questions.” This low-pressure environment allowed participants to engage without fear of judgment, reinforcing its value as a tool for internal motivation rather than external accountability.

5. Personalization

“Even though it wasn’t a real person, it felt like it spoke to me. Like it knew I needed that prompt today.” Despite its generic programming, several participants perceived the assistant as responsive and personally relevant. This perception may have amplified its reflective impact.

Appendix E. Codebook

This codebook presents the six codes used in the thematic analysis of GPT-assisted reflection transcripts. Three codes were derived deductively from the theoretical framework; three emerged inductively from immersion in the dataset. All codes were applied using a three-level scale: **Absent** (not present in the participant's transcript), **Present** (identifiable but not dominant), or **Central** (the defining feature of the participant's reflection).

Table E1. Codebook: Definitions, Sources, and Examples

Code	Definition	Source	Example from corpus
E1.1 Deductive codes			
D2 Self-efficacy	The participant expresses confidence or lack of confidence in their ability to initiate or sustain change. Includes explicit statements of capability, doubt, or past failure as evidence of low self-efficacy.	Bandura (1986); Prochaska & DiClemente (1983)	"I've tried everything and nothing sticks" (Andrea); "I know I can do it if I get organized" (Luis Eduardo)
D3 Decisional Balance	The participant explicitly or implicitly weighs the pros and cons of changing a habit or behavior. Includes expressions of ambivalence, cost-benefit reasoning, or awareness of trade-offs.	Prochaska & DiClemente (1983)	"I know I should eat better but at home it's very hard" (Karen); "Is it actually worth it financially?" (Camilo)
D4 Critical Reflection	The participant moves beyond describing behavior to questioning the assumptions, values, or narratives underlying it. Includes reframing, self-interrogation, and perspective shifts.	Mezirow (1997)	"The way I try to improve often exhausts me more than it takes care of me" (Karen); "Maybe I don't need to do more things, just look at myself with more kindness" (Karen)
E1.2 Inductive codes			
I1 Structural Barrier	The participant identifies contextual factors outside their individual control that prevent or complicate change. Includes work schedules, family culture, urban environment, or economic constraints.	Emergent from data	"At home it's hard for anyone to set an example because of my husband's culture" (Andrea); "My work hours leave very little time for family" (Federico)

Code	Definition	Source	Example from corpus
I4 Emotional Load	The participant arrives at the conversation carrying a level of stress, anxiety, or exhaustion that functions as an active barrier to change. Distinct from structural barriers — this is internal emotional saturation rather than external constraint.	Emergent from data	"I don't sleep thinking something might happen to my daughter" (Margarita); "I feel disconnected and I don't know how to fix it" (Jessica)
I5 Micro-action	The participant identifies or commits to a very small, concrete first step toward change. Characterized by low threshold, immediate applicability, and personal relevance. Often the key transition marker between Preparation and Action stages.	Emergent from data	"Our magic minute before bed" (Jessica); "Just 10 minutes of movement a day — that's where I'd start" (Silvana)

Note on coding procedure. Codes were applied independently to each of the 20 participant transcripts following Braun and Clarke's (2006) six-phase thematic analysis method. The complete coding matrix is available in the supplementary materials. Three deductive codes (D2, D3, D4) were identified a priori based on the theoretical framework; three inductive codes (I1, I4, I5) emerged through repeated reading and immersion in the dataset prior to any theoretical mapping.

Simple License for Reproduction and Public Access to the Graduation Thesis

I, Leonardo De la Hoz Borrego,

1. grant the University of Tartu a free license (simple license) to reproduce, for the purpose of preservation, including adding to the digital archive ADA, the work I created:
Reflecting on Health and Sustainability: A GPT-powered Intervention to Support Parental Awareness and Family Well-being, supervised by **Liisi Pajula**, until the expiry of the term of copyright.
2. I grant the University of Tartu permission to make the work referred to in point 1 publicly available through the University of Tartu web environment, including the digital archive ADA, under the Creative Commons licence CC BY NC ND 3.0, which allows, by referring to the author, the work to be reproduced, distributed and communicated to the public, and prohibits the creation of derivative works and the use of the work for commercial purposes, until the expiry of the term of copyright.
3. I am aware that the rights referred to in points 1 and 2 also remain with the author.
4. I confirm that by granting the simple licence I do not violate the rights arising from the legislation on intellectual property or the protection of personal data of other persons.

Leonardo Javier De la Hoz Borrego

Leonardo De la Hoz Borrego

May 23rd, 2026

Audit trail

Details

FILE NAME	DelaHoz_Leonardo_ma.docx - 23/5/26, 4:40 p.m.
STATUS	Signed
STATUS TIMESTAMP	2026/05/23 21:41:24 UTC

Activity

SENT	leonardo@ledelab.group sent a signature request to: Leonardo Javier De la Hoz Borrego (leonardo@ledelab.group)	2026/05/23 21:40:30 UTC
SIGNED	Signed by Leonardo Javier De la Hoz Borrego (leonardo@ledelab.group)	2026/05/23 21:41:24 UTC
COMPLETED	This document has been signed by all signers and is complete	2026/05/23 21:41:24 UTC

The email address indicated above for each signer may be associated with a Google account, and may either be the primary email address or secondary email address associated with that account.