The Domestic Operating System: An Empirical Investigation of Digital Technology and Hidden Work in the Home

Sarah Lucy Frampton
UCL Interaction Centre
University College London
London, United Kingdom
s.frampton.12@ucl.ac.uk

Sandy J J Gould
School of Computer Science and Informatics
Cardiff University
Cardiff, United Kingdom
goulds@cardiff.ac.uk

Anna L Cox
UCL Interaction Centre
University College London
London, United Kingdom
anna.cox@ucl.ac.uk

Abstract

Digital technologies play a role in the cognitive work of managing households, yet much of this labour remains invisible, making it harder to share, delegate, or value. Existing tools support household tasks but focus on visible activities such as chores or planning, leaving unclear how hidden domestic labour is supported. To address this, we surveyed 50 participants and conducted qualitative analysis. We found that value-driven labour, such as managing household vision and values, shapes other labours yet remains least visible and hardest to delegate. Domains like inclusion and special events appear salient in everyday life yet remain largely unsupported by current tools. We found that while family management is collaborative, most tools remain oriented to single users. We contribute an empirical mapping of digital support and gaps across six forms of family management labour, and offer a foundation for anticipating how emerging domestic technologies may support or inadvertently reshape this work.

CCS Concepts

• **Human-centered computing → HCI theory, concepts and models**; *Empirical studies in HCI*; User centered design; Field studies.

Keywords

Family management labour, Hidden labour, Household coordination, Domestic technology design, Feminist HCI

ACM Reference Format:

Sarah Lucy Frampton, Sandy J J Gould, and Anna L Cox. 2026. The Domestic Operating System: An Empirical Investigation of Digital Technology and Hidden Work in the Home. In *Proceedings of the 2026 CHI Conference on Human Factors in Computing Systems (CHI '26), April 13–17, 2026, Barcelona, Spain.* ACM, New York, NY, USA, 23 pages. https://doi.org/10.1145/3772318.3791167

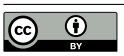
1 Introduction

Digital technologies increasingly mediate the work of managing households, from personal productivity tools to smart home systems. Many tools support visible, physical domestic tasks such as cooking, cleaning, or childcare, for example, a smart washing machine that sends a notification when a cycle ends [12, 56]. While such features address the mechanical task, they leave untouched the hidden layers of labour that surround laundry. Beyond folding or putting clothes away, this labour involves anticipating when items are needed, balancing competing priorities (e.g. school uniforms versus work clothes), responding to disruptions such as spills or weather changes, and negotiating standards of cleanliness within the household. These activities involve subtle value-driven judgements and continual replanning, yet remain largely unsupported by current technologies.

Some of these cognitive labours, such as financial planning and scheduling, are increasingly acknowledged in HCI and addressed by widely adopted tools like banking apps and shared calendars [29, 52]. However, other forms of family management labour remain conceptually and practically underexplored. Feminist and sociological researchers have begun to define and categorise these labours [16, 45, 46], while technology scholars have shown that domestic technologies can both obscure and exacerbate household dynamics, introducing new burdens, reinforcing outdated norms, or encoding structural inequalities [31, 41, 56].

The failure to adequately value, support, or redistribute hidden cognitive labour has been linked to significant personal and societal costs [23, 40, 49]. While prior work in HCI has offered knowledge that supports important interventions into family collaboration, personal information management (PIM), automation and smart home design [5, 24, 39, 43], there is limited research into how technologies such as smart home systems, family productivity apps, and AI-assisted services interact with the full range of domestic cognitive labour, particularly its emotional, value-driven, and less structured aspects. These gaps may exist because much domestic cognitive labour is fragmented across daily routines and resists the neat formalisation that digital systems rely on.

As concerns about care, time scarcity and household coordination gain visibility in policy, media and commercial discourse, digital systems are increasingly promoted as solutions to domestic pressure [24]. Histories of domestic automation show that technologies repeatedly enter the home with the promise of easing this strain, even as they tend to reframe rather than remove underlying labour [25, 56]. Contemporary smart home systems, family productivity apps and AI-assisted services extend this trajectory: they offer assistance with planning, scheduling and monitoring but do not engage with the anticipatory, interpretative and value-driven work that organises everyday family life. Understanding hidden family management labour is therefore essential for HCI, because



CHI '26, Barcelona, Spain

ACM ISBN 979-8-4007-2278-3/26/04
https://doi.org/10.1145/3772318.3791167

as new systems mediate cognitive and emotional work they may support it, displace it, or reorganise it in ways that remain poorly understood. Without a clear account of this labour, design risks reinforcing inequalities or obscuring forms of work that are meaningful, relational and consequential.

This paper addresses that gap. We investigate six distinct forms of hidden family management labour, drawing on sociological and feminist taxonomies to structure a qualitative survey of 50 participants. We analysed responses using two complementary approaches: a content analysis to compare participant experiences against existing taxonomies, and a thematic analysis to surface broader patterns in how technologies are used, avoided, or emotionally experienced. These methods allowed us to both situate our findings within and extend current frameworks, linking an established and emerging taxonomy to digital tool use, while highlighting tensions and opportunities that design might address. We contribute empirical insights by surfacing participants' accounts of value-driven meta-labour, described here as Life-Crafting, the ongoing work of managing household vision and values, and how they describe it as coordinating and shaping other forms of family work. Participants' accounts suggest that value-driven meta-labour underpins other forms of family work and shapes how technologies are interpreted, assessed, and incorporated into daily routines. This form of labour is highly fragmented, often invisible, and poorly supported by current technologies, particularly in complex or hybrid domains such as inclusion, special events[1], and life balance. We show that participants often describe family management as collaborative, while the tools participants used are commonly individualised.

These insights matter for HCI because they reframe domestic technology design beyond efficiency and task support. They position the relational, value-driven, and meaning-making aspects of family life as central to user experience and a frontier for design innovation. We argue that addressing these gaps opens opportunities for technologies that surface hidden work, redistribute responsibilities, and strengthen the connections that make family life meaningful. By grounding design in the lived realities of hidden family work, our analysis offers a foundation for anticipating how emerging domestic technologies, including AI-driven and agentic systems, may either support this labour or risk reshaping it in unintended ways.

1.1 Positionality Statement

Our research is driven by a desire to use technology to improve equality and quality of life within the domestic space. We share a widely held feminist belief that gender is largely a social construct, one that has a role in shaping and is shaped by technology. Each of us, in our own way, identifies as a family manager, by which we mean those who take on the cognitive and emotional work of coordinating family life [46]. This experience inevitably shapes how we interpret and value the forms of labour we investigate. This positionality shaped the questions we asked, the examples we attended to, and how we interpreted both enjoyment and burden in participants' accounts. We return to this in our reflexive thematic analysis and discussion, where we reflect on how our standpoint as feminist HCI researchers and design practitioners informs our reading of the data and the risks we highlight for future technologies.

[1]We use "special events" as shorthand for moments participants described as standing out from routine, such as religious or cultural observances, celebrations, and life important transitions.

2 Background and Related Work

In this section, we draw on literature from sociology and HCI on family, cognitive household labour, domestic technology, personal information management, and the relationship between technology and hidden labours, in order to understand how these domains inform the design and use of digital tools in the home.

2.1 Cognitive and Emotional Labour in the Home

While domestic labour is often associated with physical tasks such as cooking, cleaning, and childcare, feminist and sociological research draws attention to the cognitive and emotional work that also sustains family life. Here, "family" is understood broadly, including nuclear, blended, same-sex, single-parent, or multi-species households with pets [27, 36, 54]. United by intentional relationships, mutual support, and care rather than traditional structure [60]. We focus on the cognitive and emotional labours carried out by those who see themselves as family managers. Following Robertson et al. [46], we define family management labour as "family-related mental labour," or more broadly, "thinking performed for the sake of accomplishing family goals." Prior research often refers to this as the *gendered mental load*, reflecting its unequal distribution and historical association with women [9, 15, 40]. We use the term *family management labour* to avoid reinforcing gendering, while still recognising its history and dynamics.

Two related concepts underpin this work. *Cognitive labour* in the family context includes anticipating needs, generating options, making decisions, and monitoring outcomes, often invisible and mentally taxing [9, 15, 23]. *Emotional labour* describes managing one's own and others' emotions to maintain family harmony, likewise invisible and unequally distributed, often falling to women and marginalised groups [21, 47].

These less visible forms of labour include planning meals, managing schedules, anticipating needs, and monitoring wellbeing [29, 52]. They are typically hidden because they are mental, embedded in other activities, and anticipatory rather than reactive [15]. In practice, much of this work is invisible to others in and around the household (partners, children, extended family), and to institutions and designers, because it is folded into everyday routines rather than recognised as work in its own right. This invisibility is compounded by cultural assumptions that such work is natural, intuitive, or an expression of care rather than skilled labour [23]. Scholars argue that this invisibility matters because it obscures the scale and complexity of the work, making it harder to recognise, value, and share [45]. It also conceals the emotional and relational dimensions that sustain household wellbeing. Without recognition, this labour remains unequally distributed and unsupported, limiting possibilities for intervention, including technological support.

The research into hidden *cognitive labours* describes stages of cognitive family management such as anticipation, identification,

decision making, and monitoring [14]. In *emotional labour* research, Gross's Extended Process Model (EPM) conceptualises regulation as identifying the need to intervene, selecting a strategy, and implementing it [20]. These cognitive and emotional labours are largely internal, embedded, and rarely documented. For example, supporting a toddler through potty training is not a single task but a cascade of cognitive and emotional adjustments. Parents must anticipate readiness and possible challenges, preparing the household with spare clothes, cleaning supplies, and protective covers. They identify approaches by seeking advice from health professionals, family, or online communities, often weighing conflicting recommendations. They decide which strategies fit their family's values and their child's temperament, whether to reward, wait patiently, or enforce routines. They monitor progress daily: noting accidents, encouraging successes, soothing frustrations, and adapting contingency plans for trips outside the home. Alongside these cognitive steps, parents regulate emotions: hiding frustration when progress stalls, finding ways to soothe an anxious child, or practising patience to maintain a supportive environment. These overlapping cognitive and emotional labours are deeply tied to family wellbeing and values, yet remain largely invisible, concentrated with one person, and rarely recognised as "work". The consequences of hidden work are well documented: stress, mental overload, relationship strain, and unequal distributions of responsibility [9, 21, 40].

Sociological research has begun to develop taxonomies [16, 45, 46] and typologies [63] to define these forms of labour. Taxonomies provide a structured way to name and analyse otherwise hidden and fragmented activities. Daminger [16] identifies nine domains: food, childcare, logistics, cleaning, finances, social ties, shopping, maintenance, and travel. Reich-Stiebert et al. [45] add five constitutive elements (cognition, management, communal orientation, anticipation, invisibility). Robertson et al. [46] offer a complementary taxonomy of discrete labour forms spanning both cognitive and emotional, elicited from focus groups with mothers, which we use later to structure our survey (See table 1).

Daminger also elaborates "Doing Gender" (e.g. cleaning) and expands it to "Thinking Gender," the cognitive element of gender performance (e.g. noticing the need for cleaning). This framework helps define how gendered mental load is constructed and points to opportunities for undoing gendered caregiving patterns. Weeks and Ruppanner [63] differentiate between core tasks, which are regular and non-deferrable (such as feeding and cleaning), and episodic tasks, which are less frequent (such as maintenance and finance). They note that episodic work often appears more visible despite its lower frequency. Together, these perspectives highlight how hidden labour is not only distributed across domains but also shaped by gendered dynamics and the different rhythms of family life.

Reich-Stiebert et al. [45] synthesise 44 discreet terms across the gendered mental load literature. Their framework blends types (e.g. planning) and characteristics (e.g. invisibility) of labour, offering a broad conceptual map. By contrast, Robertson et al. [46] focus on naming and describing discrete forms of domestic cognitive and emotional labour, elicited from focus groups with mothers. The resulting forms of labour are summarised in Table 1. Their taxonomy provides a clear set of distinct categories, which are useful for structuring systematic investigations. Because these two taxonomies serve complementary purposes, Reich-Stiebert characterises lived experience, while Robertson distinguishes specific types. In this study, Reich-Stiebert guided content analysis and Robertson structured the survey.

Table 1: Robertson et al.'s labour types [46]. This framework represents both seen (e.g. delegating) and unseen tasks (e.g. anticipating needs) but all refer to work that is largely internal.

Labour Type	Description
Planning and strategising	This includes time management, planning family activities, researching and developing "how-to" plans for family life (e.g. potty training method) and contingency planning.
Monitoring and anticipating need	Monitoring resources (e.g. money), monitoring children's whereabouts. Predicting hunger and tiredness in others.
Metaparenting	Similar to 'how-to' planning but more focussed on the vision and values that are applied by the family. For example how you discipline children, how you will resolve conflict, and which activities you do together.
Knowing, learning and remembering	Learning about your family's needs as well as testing and iterating this knowledge. Remembering all the needs on time and in context. Researching illness and learning needs of family members or even pets.
Managerial Thinking	Including delegating and instructing: orchestrating, evaluating, delegating, everything from finances to meals.
Self-regulation	Regulating your own emotions and behaviour in the best interest of the family. Mental preparation, cognitive and emotional regulation strategies.

Although Robertson et al.'s study focused on mothers, the taxonomy and labour types they describe are not exclusive to parenting activities. Only the category of *Metaparenting* directly references parenting, but the term more broadly concerns curating shared values and visions. In this broader sense, Metaparenting shares features with adjacent literatures such as Life-Crafting [61], Job Crafting [38], and Conservation of Resources (COR) theory [22], which all explore how people define meaningful goals and invest effort in their pursuit. Together, these perspectives suggest that meta-level labours like vision setting and value alignment are central across household types. However, these frameworks typically focus on individual flourishing or occupational roles. In this paper

we adapt the notion of Life-Crafting to the domestic sphere, treating it as a collective, value-driven labour that orients household decisions over time.

Within HCI, some progress has been made toward supporting aspects of this work. Boundary and border theory models underscore the skill and effort required to balance domestic and professional responsibilities [10, 32, 34]. Sadka and Antle [50] show that most interactive emotion regulation systems target individual self-regulation, with little support for social or cooperative dynamics central to family life. Wadley et al. [62] argue that psychological models should inform design, noting that social interaction is critical yet underexplored. While these examples indicate progress, they remain oriented toward professional or wellness contexts rather than the relational, value-laden, and cooperative settings of domestic life.

Taken together, these perspectives underline that cognitive and emotional labours are both significant, underexplored, and often hidden in everyday family life. They also highlight why the design of domestic technologies must move beyond task efficiency to address relational, reflective, and value-laden dimensions of family management.

2.2 Technologies in the Home

Digital technologies increasingly shape how family management labour is organised, distributed, and understood. From smart home devices and automation tools to calendars and wellness trackers, these systems can both enable and complicate household coordination. Some scholars argue that technologies tend to reflect the priorities of institutions, markets, and data economies, focusing on visible or commercially valuable forms of work while overlooking relational or less tangible aspects. At the same time, HCI research has begun to develop tools and frameworks that engage seriously with the cognitive and emotional dimensions of family life, offering a foundation for more equitable and context-sensitive support.

Some HCI scholars caution, that the notion of visibility is not inherently emancipatory. Raval [44] argues that making hidden labour visible can highlight exploitation without actually addressing the structural conditions that reproduce it citing hidden digital piecework carried out in the global south. Suchman's foundational argument about "making work visible" [58] similarly highlights a paradox. Revealing the detailed flows of work can support design of digital tools, but visibility can also expose workers to surveillance or displacement by automation. In some settings, workers deliberately use invisibility as a form of protection or autonomy. These debates raise important questions for domestic contexts. As automation tools become increasingly capable of modelling and predicting aspects of family life, making cognitive and emotional labour more visible may risk framing it as suitable for automation. Understanding the kinds of visibility that support families, and the kinds that may endanger them, is therefore an essential precursor to design.

Historical critiques remind us that these problematic paradoxes are not new. Cowan's More Work for Mother [12] showed how washing machines and stoves reshaped rather than reduced household labour, replacing paid or enslaved labour with unpaid domestic work by women and raising expectations for care and cleanliness. Contemporary critiques echo these dynamics. Sadowski [51] argues that smart home devices serve platform companies more than households, reducing some labour while creating new invisible ones: a digital calendar coordinates appointments but also requires upkeep and negotiation, while a smart doorbell reassures but produces new obligations around data and surveillance. Similarly, feminised voice assistants reproduce submissive stereotypes and care roles [56], and smart systems marketed as convenient often demand maintenance and troubleshooting [31, 65], sometimes shifting household power dynamics [3].

Hester and Srnicek's history of domestic technology [25] further illustrates how automation often reframes, rather than removes, domestic labour. They argue that many contemporary systems alleviate only minor frictions, while more meaningful or value-laden tasks remain unchanged or become more demanding. For example, they describe digital tools that outsource the visible or performative parts of family work, such as entertainment or education, while leaving the underlying coordination, care and value-setting intact. Smart ordering systems that track previous purchases or pantry inventories and automatically suggest or schedule grocery orders reduce the friction of buying groceries, but leave the harder work to the family manager: deciding what is appropriate to buy, what is affordable, and how choices align with health, cultural or environmental values. Similarly, their discussion of assistive parenting technologies shows that tools which keep children entertained or occupied do not reduce the planning, monitoring and emotional labour involved in care. In the context of home-based medical technologies they show how clinical tasks are shifted to unpaid family members who must adapt domestic spaces and routines to therapeutic needs. Together, these examples highlight a continued risk that new digital tools can displace labour rather than reduce it, especially when the underlying cognitive and emotional work is not recognised [25].

Entirely new digital household labours have also emerged. Strengers' "pleasance" highlights the effort of creating ambiance through lighting, scent, or music, often dismissed as trivial [57]. "Digital housekeeping" captures the work of managing devices, passwords, updates, and data hygiene [65]. These replicate gendered patterns, though some newer tasks, such as pleasance and device management, are increasingly coded as male. Each innovation tends to raise expectations without reducing effort [6, 31].

Research on AI in domestic contexts, including cloud-based services and emerging edge-AI devices that run models locally in the home [2], shows that it risks repeating the same flawed premises as earlier domestic technologies. Hertog et al. [24], for example, explore the potential of AI for household support but focus on time savings from automating physical tasks like cooking and laundry, while overlooking the cognitive and value-driven coordination that makes these tasks possible. Research into AI supported parenting too shows parents are understandably cautious: Petsolari et al. [42] report concerns about losing authority, undermining trust, and depending on systems that fail to grasp the foundational values and emotional nuance of family management. These concerns are justified. As Perez [41] demonstrates, AI systems are built on partial and biased data, meaning that domestic AI is likely to reproduce inequality and obscure hidden labours rather than alleviate them.

Another emerging debate in human–AI collaboration concerns the balance between augmentation and automation: when should AI support and extend human judgement, and when should it take over tasks entirely? Dell'Acqua et al. surface this in two related ways: they distinguish between "centaur" models, where AI scaffolds human judgement, and "cyborg" models, where tasks are more fully merged or delegated, and they show that large language models only improve performance when tasks already fit the model's capabilities [17]. Family management labour may be an important site for exploring these questions, because sociological work suggests it involves hidden, value-laden and gendered forms of work that are poorly represented in current datasets. Current smart home and domestic systems mostly operate in the augmentation space, offering informational scaffolding through calendars, reminders, shared notes and voice assistants rather than automating anticipatory, evaluative or value-driven aspects of family management. While this may align with what some families prefer, this assumption warrants careful examination. For HCI, a key question is how far domestic AI should augment, divide or automate aspects of family management labour, and what risks emerge when technologies optimise for efficiency, prediction or behavioural compliance in domains that are relational, normative and sensitive to household values, and that may be weakly captured in underlying data.

Within HCI, attention to cognitive labour has emerged through fields such as Personal Task Management (PTM), which studies digital to-do lists, tracking apps, and time management systems [1, 30]. Relatedly, Personal and Family Information Management (PIM/FIM) investigate how households handle bills, schedules, and documents [28, 52], often finding one member becomes the de facto manager. This work highlights both stress and satisfaction in managing information, resonating with Robertson et al.'s notion of Metaparenting, which links values and long-term vision to both burden and fulfilment [46]. Design recommendations in this space include supporting fragmented collaboration, life stage transitions, and privacy needs. Shared calendaring studies show the importance of balancing primary organisers with peripheral users, and of treating calendars as communicative tools with emotional nuance [39].

Extensions into Personal Health Information Management (PHIM) explore the tension between emotional labour and practical coordination in families managing health needs [64]. Findings emphasise inclusive systems that accommodate multiple users, support autonomy and privacy, and account for family dynamics. These concerns align directly with labours such as monitoring, value-based decision-making, and self-regulation in care.

Taken together, existing research shows that domestic technologies, whether historical, smart, or AI-driven, often obscure, shift, or complicate the labours they claim to support. While some tools address aspects of household management effectively, they typically reflect institutional, commercial, and market priorities. This means that visible and readily automatable tasks are prioritised, while less tangible, relational, and value-laden labours are overlooked [12, 24, 51].

In contrast, sociological research offers robust taxonomies and typologies of hidden family management labour [16, 45, 46, 63]. These frameworks consistently document domains such as food, childcare, cleaning, and social ties, which remain largely absent from HCI taxonomies. They also highlight how this work is often centralised in a single individual, embedded in emotional dynamics, and historically feminised. Yet links between this body of work and HCI remain limited. Adjacent areas such as personal information management and smart home research engage with similar concerns, but are rarely grounded in these sociological foundations.

Despite longstanding critiques showing that domestic technologies often reshape rather than reduce labour [12, 25, 56], the home remains a space where digital systems continue to be introduced, adopted and normalised. This is happening not only through commercial platforms and institutional pressures, but also through the rapid expansion of AI systems, including emerging forms of on-device or edge-based automation via smarthomes [2, 56]. These technologies will shape family management labour regardless of whether they are well suited to it. This creates a pressing question for HCI: how can we guide the design and deployment of domestic technologies so they do not deepen problematic invisibilities, inequities and hidden burdens documented in sociological research? We take the position that understanding cognitive and emotional family management labour is essential not because technology is the inevitable solution, but because technology will inevitably act on this work. Our study therefore offers an empirically grounded account of how family managers describe these labours and the tools they draw on today, providing an evidence base that can support more careful, values-aligned and socially attuned approaches to domestic technology design.

3 Research Questions

Our three research questions are:

- **RQ1** Which specific labours identified in this study align with, or diverge from, the taxonomy of family management labour proposed by Reich-Stiebert et al. [45], and what digital tools or technologies are used to support these discrete activities?
- **RQ2** Which domains of family management labour identified in this study align with, or diverge from, those proposed by Daminger [16], and what digital tools or technologies are used to support them?
- **RQ3** How do participants' experiences of the cognitive and emotional family management labour described by Robertson et al. [46] surface needs, challenges, and opportunities for digital technologies that aim to support this work?

4 Method

4.1 Participants

We recruited 61 United Kingdom based participants on Prolific using pre screening to ensure diversity in household composition (mixed and same sex couples, with and without children or informal caring roles) and socioeconomic background (education as proxy). We restricted participation to United Kingdom residents to keep cultural context consistent. We did not collect race or ethnicity in this scoping study because our survey method and sample size were not suited to meaningfully analysing intersectional variation. We note in the Limitations that family norms and labour expectations are shaped by cultural, social, and structural histories, and that our approach therefore reflects a partial perspective. Future work

would benefit from methods better able to foreground pluralism and standpoint. Participants received £4.50 for a 30 minute survey. Participation was voluntary. The study was approved by the university's ethics committee.

Prior to analysis, we applied a single exclusion criterion: submissions that did not complete all survey sections were excluded. 11 submissions met this criterion and were removed, yielding the final analytic sample of N = 50.

Participants ranged in age from 18 to 67 (median 39). Gender: 15 identified as male, 34 as female, 1 as non-binary; no participants selected "prefer not to say" or "another gender." We did not ask about sex assigned at birth. Thirty two were cohabiting with a partner. Household compositions and management roles are reported in Tables 2 and 3.

Table 2: Household Characteristics

Category	Number
Mixed-sex couples with no children	14
Same-sex couples with no children	7
Mixed-sex couples with children	9
Same-sex couples with children	2
Single parents	4
Households with adult dependents	2

Table 3: Household Management Roles

Role	Number
Primary household manager living with others	16
Living alone	8
Shared responsibility equally	20
Secondary supportive household role	5
Not involved in household management	1

4.2 Materials

The survey was built in REDCap for secure, GDPR compliant data capture. Data were stored in the University's Data "safe haven" for special category information (relationship status and sexual identity).

The survey comprised four parts: (1) Information sheet and consent presented digitally in line with ethics guidance. (2) Demographics: age, education, employment, household composition, role in household management, gender, relationship status, and caregiving roles, using multiple choice, open text, and dropdown items (some aligned with national statistics). (3) Types of Cognitive Labour: six categories — Planning and Strategising, Monitoring and Anticipating Needs, Family Vision and Values (formerly Metaparenting[2]), Knowing (Learning and Remembering), Managerial Thinking (including Delegating and Instructing), and Self Regulation — structured around Robertson et al. [46]. For each category, participants rated engagement, identified who does the work, and gave examples, tools used, and whether tools created extra work (further detail included in Appendix A).

[2]We adopt "Family Vision and Values" over "Metaparenting" to include non parent households while retaining the original construct.

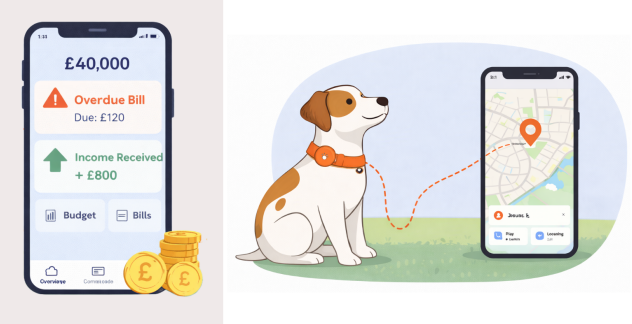


Figure 1: This probe explains an example of the concept of monitoring using the example of tracking pets and tracking finances. Example materials generated by the authors using GPT-4.

(4) Probes and visibility: We used image-based informational probes [13] (Figure Appendix B) to prompt reflection on otherwise abstract or hidden forms of labour. These were followed by closed and open questions (e.g., perceived relevance and salient examples). Participants also rated the visibility of cognitive labour and prioritised future support (Figure 2 and Appendix B).

4.3 Procedure

Participants followed a Prolific link to the REDCap survey. Demographics, including special category items, were collected first. Category questions were presented in random order to reduce order effects and fatigue. The survey combined Likert-scale items (relatability), multiple-choice items (responsibility attribution), and open-text responses. Each labour type was preceded by a short definition and example to ensure shared understanding (See Appendix A). The survey took an average of 19 minutes (range 3 to 81). Although one participant completed in 3 minutes, all six sections were completed, and because exclusion criteria were based solely on completeness rather than completion time, this case was retained. For the remaining 49 participants, completion time ranged from 7 to 81 minutes. Before analysis, data were exported from the data safe haven with demographic and special category fields removed, retaining only the open and closed responses about labour.

4.4 Analysis and Results

We used a mixed-methods approach to analyse the data, combining inductive and deductive strategies to explore participants' experiences and their use of digital tools in relation to family management labour. For RQ1 and RQ2, which focused on mapping our findings to existing non-HCI taxonomies of labour types, activities, and domains, we conducted a structured content analysis using deductive category assignment [37]. This systematically examined how participant-reported practices aligned with or diverged from prior frameworks. The results are presented in tabular form (tables 4, 5, 6) to show overlaps, digital tools used, and any novel contributions from the study.

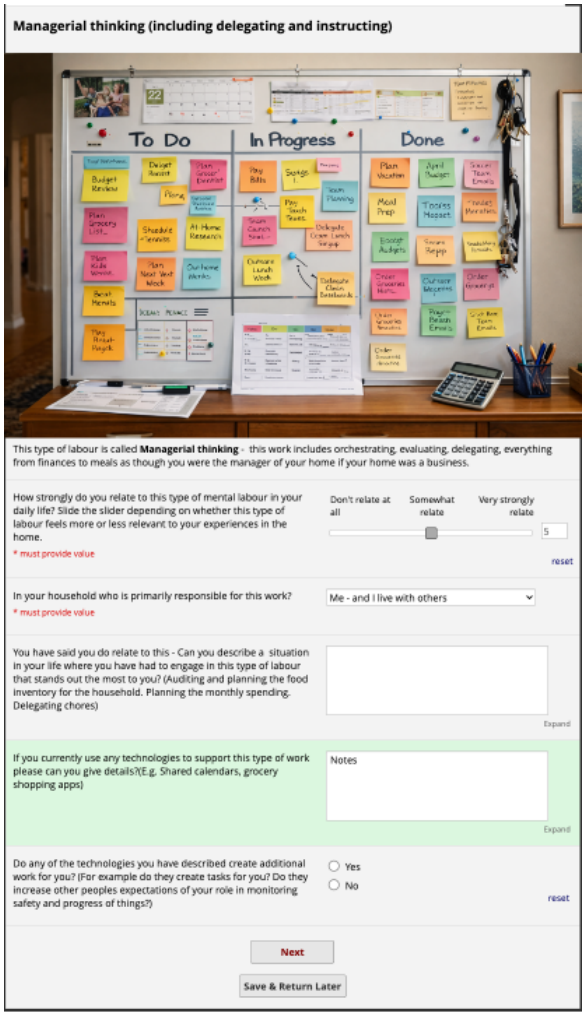


Figure 2: Example of Survey section - Managerial Thinking probe and questions

Open-text responses were analysed in two stages. First, we carried out a deductive content analysis, mapping each open-ended response onto descriptions of concrete practices, digital tools, and the household domains in which they occurred (e.g. food, childcare). Second, we conducted an inductive thematic analysis to identify cross-cutting patterns in how participants described their practices, emotions, and use of digital tools. This combined approach allowed us to validate existing taxonomies while surfacing themes that extended beyond them.

To address RQ3, we conducted a reflexive thematic analysis [4]to examine how participants' experiences surfaced needs, challenges, and opportunities for technologies that aim to support this work.

The sections that follow present analysis methods and findings for each research question. We begin with taxonomy-related results from the content analysis (RQ1 and RQ2), followed by the thematic analysis findings for RQ3.

4.5 RQ1 Analysis

To address RQ1—*Which specific labours identified in this study align with, or diverge from, the taxonomy of family management labour proposed by Reich-Steibert et al. [45], and what digital tools or technologies are used to support these discrete activities?*, we employed deductive content analysis.

We first openly coded participants' accounts of family management labour, identifying discrete types of work. These codes were then systematically compared with Reich-Stiebert et al.'s taxonomy of 44 labour terms, drawn from 31 sociology papers on gendered mental load [45]. To guide this process, we used Mayring's *Structuring–Deductive Category Assignment* approach [37], which allowed us to assess how participant accounts aligned with, extended, or challenged existing concepts. The steps were:

(1) **Define Categories:** Adopt Reich-Steibert et al.'s 44 terms and definitions.
(2) **Develop a Coding Guideline:** Link codes to taxonomy categories. If no clear semantic or conceptual match was found, the code was labelled as novel.
(3) **Coding (mapping):** Map our codes systematically to taxonomy categories. Where multiple codes converged (e.g., "monitoring", "watching", "surveillance"), we recoded under a single taxonomy term. Where no match existed, we retained a novel code.

Finally, insights from this content analysis informed our thematic analysis for RQ3, where we refined cross-cutting themes. Visual icons supported this process by showing relationships between technologies, experiences, and domains.

4.6 RQ1 Results

The content analysis reveals four key findings: (1) an established taxonomy of terms aligned with our data; (2) several novel terms extended current understanding; (3) established terms clustered around familiar domains such as Feeding and Care for Children, while novel terms surfaced in less-explored domains like Inclusion and Special Events; and (4) novel terms were also linked to a scarcity of supporting digital tools.

4.6.1 ***Content Analysis Results.*** Tables 4 and 5 summarise these findings.

Rows 2–9 show terms mapped directly to Reich-Stiebert's taxonomy. Rows 11–20 show terms we re-coded to match where appropriate (e.g., Monitoring, Noticing, Tracking, Observing → "Monitoring"). Rows 22–29 show terms retained as distinct when the closest taxonomy match diverged too much. For example, "Inventory management" was considered for "Monitoring" or "Organising" but did not capture the essence of the data (see quote below), so it was retained.

> "Ordering at the butcher and organising the best day to buy all the fresh ingredients needed"

Rows 31–39 show terms with no candidate matches, retained as novel. Table 5 lists taxonomy terms not present in our data, most of which are characteristics rather than activities, and thus outside our coding scope.

Table 4: Taxonomy Data showing final taxonomy or terms from our data alongside the associated labours, domains and digital tools

No.	Original Taxonomy from Open Coding Taxonomy	Reigh-Stiebert et al. 2023 Taxonomy	Final Taxonomy	Labour types where this was found	Domains related to the term	Digital tools used
			Matched terms			
2	Planning	Planning	Planning	Planning and Strategising, Managerial Thinking	Feeding, Travel/Leisure, Care for Children, Shopping/Purchasing, Finance	Notes, Calendars, Social Media, Spreadsheets, To-do, Banking Apps, Search Engines, Shopping Apps
3	Remembering	Remembering, Retention, Recalling, Retrieval	Remembering	Planning and Strategising, Knowing learning and remembering	Feeding, Care for Children	Notes, Calendars, To-do, Reminders, Shopping Apps
4	Assisting Others	Assisting others	Assisting others	Planning and Strategising	Inclusion	Reminders
5	Delegating	Delegating	Delegating	Planning and Strategising, Managerial Thinking	Feeding, Travel/Leisure, Finance	Notes, Spreadsheets, Search Engines
6	Coordinating	Coordinating	Coordinating	Planning and Strategising, Monitoring and Anticipating Needs, Knowing learning and remembering, Managerial Thinking	Feeding, Travel/Leisure, Care for Children, Finance, Special Events	Notes, Calendars, Social Media, Spreadsheets, To-do, Banking Apps, Search Engines
7	Organising	Organizing	Organizing	Planning and Strategising	Feeding, Travel/Leisure	Notes, Calendars, Reminders, AI
8	Managing	Managing	Managing	Planning and Strategising, Knowing learning and remembering, Managerial Thinking	Feeding, Care for Children, Finance, Special Events	Notes, Calendars, Spreadsheets, Banking Apps
9	Scheduling	Scheduling	Scheduling	Planning and Strategising, Knowing learning and remembering, Managerial Thinking	Feeding, Travel/Leisure, Care for Children	Notes, Calendars, Spreadsheets, To-do, Banking Apps, Search Location Tracking, Shopping Apps
			Re-coded to Daminger terms			
11	Booking	Scheduling	Scheduling	Planning and Strategising, Knowing learning and remembering, Managerial Thinking	Feeding, Travel/Leisure, Care for Children	Notes, Calendars, Spreadsheets, To-do, Banking Apps, Search Location Tracking, Shopping Apps
12	Monitoring, noticing, tracking, observing	Monitoring	Monitoring	Planning and Strategising, Monitoring and Anticipating Needs, Knowing learning and remembering, Managerial Thinking	Feeding, Care for Children, Finance	Notes, Social Media, Spreadsheets, Banking Apps, Email, Messaging, Location Tracking
13	Taking Responsibility	Being responsible	Being responsible	Monitoring and Anticipating Needs, Knowing learning and remembering, Vision and Values (Metaparenting), Self-Regulation	Feeding, Care for Children, Finance, Inclusion	Notes, Spreadsheets, Banking Apps, To-Do Lists, Reminders, Media Apps, Surveillance equipment
14	Coaching	Instructing	Instructing	Monitoring and Anticipating Needs, Knowing learning and remembering	Feeding	Notes, To-do lists, Reminders, Maps
15	Negotiation	Orchestrating	Orchestrating	Monitoring and Anticipating Needs, Knowing learning and remembering, Managerial Thinking	Feeding, Travel/Leisure, Care for Children, Finance, Special Events	Notes, Calendars, Spreadsheets, Banking apps, Search Engines, Messaging, Reminders
16	Initiating Transactions	Deciding	Deciding	Monitoring and Anticipating Needs, Vision and Values (Metaparenting), Self-Regulation	Feeding, Finance	Calendars, Spreadsheets, Banking apps, Reminders
17	Task Management	Allocating tasks	Allocating tasks	Managerial Thinking	Home/Car Maintenance	-
18	Empathising	Other-directed	Other-directed	Knowing Learning and Remembering, Vision and Values (Metaparenting)	Feeding	Reminders
19	Positive Thinking	Reflecting	Reflecting	Self-Regulation	Work Life Balance, Inclusion	Health Apps, Wellness Apps
20	Grounding Yourself	Maintaining Control	Maintaining Control	Self-Regulation	Work Life Balance, Inclusion	Health Apps, Media Apps
			Re-coded to our terms			
22	Inventory Management	Monitoring, Organizing	Inventory Management	Managerial Thinking	Feeding	Calendars, To-do lists
23	Brokering	Orchestrating, Managing	Brokering	Vision and Values (Metaparenting)	Feeding, Care for Children	Calendars, Media Apps
24	Collaboration	Coordinating, Collective Goals	Collaboration	Vision and Values (Metaparenting)	Feeding	Media Apps
25	Diligence	Reflecting, Remembering	Diligence	Knowing, Learning and Remembering	Feeding, Care for Children	Notes, Calendars, To-Do lists, Reminders
26	Reminding	Providing mnemonic support for others	Reminding	Planning and Strategising	Inclusion	Reminders
27	Ideation	Thinking	Ideation	Planning and Strategising, Vision and Values (Metaparenting)	Feeding, Travel/Leisure, Special Events	Search Engines, Social Media, Maps
28	Balancing needs	Family needs/activities, Collective goals, Communal goals	Balancing needs	Planning and Strategising	Work Life Balance	Search Engines, Social Media
29	Advocating	Helping partners, For all in the family	Advocating	Vision and Values (Metaparenting)	Chilcare	Parental Controls
			Novel terms from our data			
31	Personalising	-	Personalising	Knowing , Learning and Remembering	Feeding	Notes, Calendars, To-do
32	Curating	-	Curating	Vision and Values (Metaparenting)	Feeding, Care for Children, Special Events	Notes, Calendars, Social Media, Search Engines
33	Researching	-	Researching	Planning and Strategising, Knowing , Learning and Remembering, Vision and Values (Metaparenting)	Feeding, Travel/Leisure, Finance	Notes, Social Media, To-do, Search Engines
34	Crowdsourcing	-	Crowdsourcing	Planning and Strategising	Care for Children	Social Media
35	Behaviour Management	-	Behaviour Management	Vision and Values (Metaparenting)	Care for Children	Social Media, Search Engines
36	Mediating	-	Mediating	Knowing , Learning and Remembering, Self-Regulation	Feeding, Inclusion	Notes, Reminders
37	Empathising	-	Empathising	Vision and Values (Metaparenting), Self-Regulation	Feeding, Care for Children, Inclusion	Notes, Calendars, Reminders, Wellness Apps, Media Apps
38	Soothing yourself	-	Soothing yourself	Self-Regulation	Inclusion, Work Life Balance	Wellness Apps
39	Soothing others	-	Soothing others	Self-Regulation	Work Life Balance	-

Table 5: Terms not found in our data from Reigh-Steibert 2023 Taxonomy

No.	Original Taxonomy from Open Coding Taxonomy	Reigh-Stiebert et al. 2023 Taxonomy	Final Taxonomy	Labour types where this was found	Domains related to the term	Digital tools used
1	-	Knowing	-	-	-	-
2	-	Encoding and storage of information	-	-	-	-
3	-	Cognitive work/labour	-	-	-	-
4	-	Anticipating	-	-	-	-
5	-	Thinking ahead	-	-	-	-
6	-	Foresight	-	-	-	-
7	-	Future-directed	-	-	-	-
8	-	Precedes physical work	-	-	-	-
9	-	Perceiving future problems and upcoming necessities	-	-	-	-
10	-	Prospective memorizing	-	-	-	-
11	-	Often invisible	-	-	-	-
12	-	Often goes unnoticed	-	-	-	-
13	-	Difficult to detect/measure	-	-	-	-
14	-	Less tangible	-	-	-	-
15	-	Performed internally	-	-	-	-
16	-	Not necessarily perceived as work by the person performing it	-	-	-	-

4.6.2 ***Content Analysis Findings:*** From these results we highlight four insights:

(1) **Established Taxonomy of Cognitive Family Management:** Many terms mapped directly or with minor recoding (rows 2–20), including Planning, Scheduling, Monitoring, Remembering, Assisting Others, Delegating, Coordinating, Organising, and Managing. These clustered within Planning and Strategising, Knowing/Learning/Remembering, and Managerial Thinking, and were consistently linked to common digital tools.
(2) **Uncharted Territories of Cognitive Work:** Novel terms included Researching, Crowdsourcing, Ideation, Balancing Needs, Behaviour Management, Curating, Personalising, Advocating, Mediating, Empathising, and Soothing (self and others). These were concentrated in Vision and Values and Self-Regulation labours, where participants more often reported a lack of digital support.
(3) **Established and Emerging Domains:** Feeding and Care for Children were consistently strong domains with links to common tools (notes, calendars, search engines). Novel domains such as Inclusion and Special Events were strongly associated with novel terms.
(4) **Conceptual Novelty and Tool Use:** Novel activities were supported by fewer and less consistent tools, aside from ubiquitous ones (e.g., calendars, notes apps, search engines). This suggests a link between conceptual maturity in the literature and the availability of digital support.

4.7 RQ2 Analysis

To address **RQ2**—*Which domains of family management labour identified in this study align with, or diverge from, those proposed by Daminger [16], and what digital tools or technologies are used to support them?*, we used deductive category assignment content analysis (CA) [37].

Domain Identification During open coding, we identified domain-related codes, enabling us to see how activities clustered into meaningful categories.

Mapping Domains to Daminger's Taxonomy (CA) We then applied Mayring's structuring–deductive category assignment method [37] to compare our domains to Daminger's taxonomy [16]. This showed which domains were most salient and how they intersected with tool use.

(1) **Defining Categories:** Daminger's domains included *Food, Care for Children, Logistics/Scheduling, Cleaning/Laundry, Shopping/Purchasing, Home/Car Maintenance, Travel/Leisure, Finances, Social Relationships.*
(2) **Developing a Coding Guideline:** We linked our codes to these categories, which was often straightforward. For example:
> "Chores to keep the house tidy; planning meals for everyone, taking allergies into account"

mapped to *Food, Care for Children,* and *Cleaning.*
(3) **Mapping Codes to Categories:** We assigned each code to one or more categories. Aligned codes were classed as *within the framework*; others as *novel contributions.*
(4) **Integrating Digital Tool Analysis:** In parallel, we examined reported tool use to identify supported and unsupported domains.

Refining Themes and Insights We used these results to refine the themes reported in RQ3. Domain icons helped us visualise links between technologies, experiences, and domains.

This approach enabled systematic comparison with sociological frameworks while examining how technology supports, or overlooks, different aspects of family management.

4.8 RQ2 Results

Our content analysis revealed key findings. It confirmed several established cognitive labour domains while introducing novel or combined categories—Inclusion, Special Events, and Work Life Balance that better capture the complexity of family management. It also highlighted disparities in digital tool use, with some domains, such as Finance, being well supported by technology, while others, such as Feeding and Care for Children, were less so.

4.8.1 ***Content Analysis Findings****.* We developed an updated taxonomy of cognitive labour domains and mapped them to labour types and digital tools.

Rows 6 to 8 of table 6 represent domains that emerged as novel but partially overlapped with Daminger's categories. For instance, *Inclusion* overlapped with Social Relationships and Care for Children, yet better captured participants' descriptions of fostering belonging, emotional safety, and participation. Likewise, *Special Events* spanned several existing domains, including Social Relationships, Food, Care for Children, Finances, and Shopping/Purchasing. Its prominence, coupled with the near-complete absence of tool use (apart from a single mention of search engines), justified its recognition as a distinct domain. Finally, *Work–Life Balance* emerged as a salient area of cognitive labour within Self-Regulation. Participants described sustained efforts to manage personal–professional boundaries, often involving deliberate routines and mental strategies. We therefore included it as a standalone domain.

Rows 9 to 11 list domains from Daminger's framework that did not appear in our dataset. This absence may reflect the nature of our sample, the survey prompts, or scale limitations.

From this analysis, three findings emerged:

(1) **Emergence of Combined or Novel Domains:** *Inclusion*, *Special Events* and *Work Life Balance* did not appear in Daminger's taxonomy but featured prominently in our dataset. These arose through combinations of existing categories, suggesting that traditional taxonomies may not fully reflect lived experience. This suggests digital tools may need to address overlapping or hybrid domains (e.g., Special Events intersecting with multiple categories).
(2) **Disparities in Digital Support Across Domains:** Domains linked to paid work (*Finance*, *Logistics/Scheduling*, *Shopping/Purchasing*) were associated with specific tools. In contrast, domains such as *Feeding*, *Care for Children*, *Cleaning/Laundry*, *Home/Car Maintenance*, *Travel/Leisure*, and *Social Relationships* had less consistent tool reporting, despite their significance.
(3) **Tensions Between Sentiment and Tool Use:** Some domains showed a contrast between sentiment and tool use.

For example, *Finance* attracted considerable negative sentiment yet had the most consistent tool use (e.g., banking apps). Conversely, more positively described domains such as *Feeding* showed less consistent digital support. This raises questions about how emotional experience intersects with adoption or availability of technological solutions.

Table 6: Domains from our data compared to Daminger [16]and associated tools

No.	Domains in our survey data	Domains from Daminger research	Final Taxonomy	Labour types where this was found	Associated tools
Matched terms					
1	Care for Children	Care for Children	Care for Children	Planning and Strategising, Monitoring and Anticipating Needs, Vision and Values (Metaparenting), Knowing Learning and Remembering, Self-Regulation	Search Engines, Notes, Calendars, Location Tracking, Social Media, Media Apps, Parental Controls
2	Travel/Leisure	Travel/Leisure	Travel/Leisure	Planning and Strategising	Search Engines, Notes, Calendars, Messaging, Email, To-do lists
3	Shopping/Purchasing	Shopping/Purchasing	Shopping/Purchasing	Planning and Strategising, Knowing Learning and Remembering, Managerial Thinking	Shopping Apps, Notes, To-Do Lists
4	Finances	Finances	Finances	Planning and Strategising, Monitoring and Anticipating Needs, Vision and Values (Metaparenting), Knowing Learning and Remembering, Managerial Thinking	Banking Apps, Spreadsheets
5	Feeding	Food	Feeding	Planning and Strategising, Monitoring and Anticipating Needs, Vision and Values (Metaparenting), Knowing Learning and Remembering, Managerial Thinking	Search Engines, Notes, Calendars, To-do Lists, Social Media, Reminders, Shopping Apps
Novel Terms					
6	Special Events	Social Relationships, Food, Care for Children, Finances, Shopping/Purchasing	Special Events	Vision and Values (Metaparenting), Knowing, Learning and Remembering	Search Engines
7	Inclusion	Social Relationships, Care for Children	Inclusion	Vision and Values (Metaparenting), Knowing, Learning and Remembering, Self-Regulation	Media Apps, Health Apps, Wellness Apps
8	Work Life Balance	Social Relationships, Care for Children, Finance	Work Life Balance	Self-Regulation	Health Apps, Wellness Apps
Terms not in our data					
9	-	Home/Car Maintenance	Home/Car Maintenance	-	-
10	-	Cleaning/Laundry	Cleaning/Laundry	-	-
11	-	Social Relationships	Social Relationships	-	-

4.9 RQ3 Analysis

To address **RQ3** —*How do participants experience the different types of cognitive and emotional family management labour described by Robertson et al. [46], and what digital tools or technologies do they currently use to support them?*— we conducted a **reflexive thematic analysis (TA)** [4]. We employed an **inductive** approach to capture participants' lived experiences and a **deductive** approach to identify and categorise digital tool usage. This combination allowed us to understand how people enact and feel about these labours, how tools are embedded in that experience, and where gaps or tensions remain.

Immersion: We familiarised ourselves with the data by repeatedly reading responses, first per participant and then across labour types. This enabled us to grasp individual narratives before identifying broader themes.

Initial Coding: Our coding was iterative and reflexive, incorporating both **deductive** (digital tools and domains) and **inductive** (experiences of family management labour) elements. We identified three primary code types:

- **Labour experiences** – Combining **semantic** codes (e.g., *planning*) and **latent** codes (e.g., *making things special*) to capture explicit and implicit aspects of participants' experiences.
- **Digital tool use** – Semantic codes categorised tools (e.g., *spreadsheets*, *banking apps*).
- **Domains** – Applying both **semantic** (e.g., *planning holidays*) and **latent** (e.g., *inclusion*) coding to identify salient domains.

To facilitate later analysis, we annotated data with both **labels** and **symbols**, allowing structured comparison of tool use across labours and domains.

Searching for Themes: We mapped codes onto a **radar chart**, linking each response to labour codes. This enabled iterative refinement of themes while maintaining close alignment with the data. Additionally, we linked digital tool usage to responses, examining patterns across domains. We then re-read responses in light of initial coding to surface deeper narratives.

Reviewing the Themes: We critically examined themes, refining them through reflection on our own **positionality** and interpretative decisions. This ensured that themes remained grounded in participants' experiences while also addressing the research objectives.

Defining and Naming Themes: Finally, we consolidated themes by synthesising narratives, defining each to capture insights while preserving nuance.

4.10 RQ3 Results

To answer RQ3, we examined how participants' experiences of cognitive and emotional family management labour surfaced needs, challenges, and opportunities for digital tools in the home. The analysis revealed six key themes. (1) *Varied Enjoyment of Cognitive Labour*, (2) *Relevance of household composition*, (3) *Feeding - The Intersection of Care, Inclusion, and Well-being*, (4) *Finance: A Recognised and Digitally Supported Domain*, (5) *Special and Sensitive Contexts*, (6) *Inclusion Through Everyday Self-Regulation*. Next we report these themes.

4.10.1 ***Theme 1: Varied Enjoyment of Cognitive Labour.*** We found that participants had both positive and negative attitudes towards the deployments of labours. From our positionality as researchers who often view these labours as burdensome sources of inequality, we expected more consistently negative accounts. For some, these tasks brought enjoyment and satisfaction, while for others they felt burdensome or emotionally taxing. In one instance, P13 noted, *"I am really passionate when it comes to organisation and scheduling, I like being proactive"* (P13), highlighting how a sense of control and proactivity can make household tasks fulfilling. Similarly, P2 illustrated how routine cooking could serve as an act of care and connection by explaining, *"I am cooking one dish every weekend because it's my partner's favourite dish."* (P2).

Technology use sometimes also seemed to influence enjoyment. For instance, P41 commented positively about both their domestic practices and the supportive digital tools they used: *"I have a vision of keeping my house tidy and creating a minimalist look while using technology."* (P41).

Some participants resisted framing family management as inherently negative, showing awareness of how the labour is perceived. These participants emphasised the value of teamwork and a well-functioning household. P37 remarked, *"it is a shared responsibility, so with two heads working together, the result is always amazing"* (P37). Another participant described the unequal division of labour as an intentional and acceptable arrangement. Reflecting on the dynamic with her husband, who is a stepfather and step-grandfather to her children and grandchildren, she explained: *"My partner still works full time and I work very little. Also, he is stepfather and granddad [sic] to my children, so I don't find this a problem."*

In contrast, participants reported that when responsibility fell solely on one person, the experience tended to be more negative. P23 lamented, *"This all falls on me. I plan all the meals, plan each childs after school activities for the week. paying the children's activities."* (P23).

Negativity regarding technology use was specifically around extra work. P10 reported using technology to monitor finances *"Monitoring money within a month to ensure we can meet the needs of Christmas time in the family"* (P10). They expressed frustration with the extra work that these tools entailed, noting, *"Additional time spent inputting values to meet the right budgets"* (P10). Other users expressed frustration with having to keep calendars and lists updated *"calendar has to be adjusted frequently; notes apps have to be ticked off and kept up to date"* (P36).

Overall, there was no consistent link between technology use and enjoyment. Instead, participants' feelings were shaped by context, domain (e.g. financial worries), labour type (e.g. self-regulation), and household circumstances (e.g. caring responsibilities).

4.10.2 ***Theme 2: Relevance of Household Composition.*** Participants' experiences of family management labour were significantly shaped by who they lived with and the relational dynamics of their households. Those living alone or without dependents often found that some labours, particularly vision and values, were less relevant. As one noted, *"I only have to consider myself so don't need*

to worry about this too much" (P5), and another stated simply, *"I don't have any dependants"* (P47). However, the labour was not irrelevant to all non-parents. Several participants in shared households without children described meaningful forms of vision and values labour, often in terms of coordination, mutual standards, and shared principles. For example, P44 explained: *"As long as you earn enough to pay bills and can save on top of that and enjoy a holiday, that's what matters. This is important for our future. We also work together to keep the house clean and ensure it's always presentable in advance of guests arriving."*

In these examples, domestic work was framed as a cooperative endeavour, shaped by cohabitation even in the absence of dependants. Participants described mutual responsibility and shared expectations as key drivers of their engagement in certain labours. As one put it, *"I co-share and we are each responsible for our own house related duties"* (P19).

Among parents, the influence of household composition was especially pronounced, with child-rearing intensifying nearly all labour types. For example, planning and strategising was closely tied to managing children's activities and social lives: *"I am a single parent so I plan all events for myself and my child. Including regular activities, play dates, seeing friends and family"* (P8). Parents also engaged in continual monitoring and anticipating needs, ranging from safety (*"Checking to see where my daughter is"* – P24) to behavioural support: *"Making sure that our son who is ADHD follows a pattern on a daily basis otherwise he will freak out"* (P29).

Vision and values (originally theorised as metaparenting) emerged strongly, with parents setting boundaries, routines, and cultivating empathy. One participant noted: *"Ensuring a consistent night-time routine is adhered to to support the development of a child in the house. Buying books and other materials to aid the learning of the child in the house"* (P3).

Even participants whose children had grown up described a lingering connection to labours linked to parenting, especially self-regulation. As P21 reflected: *"I employed self-regulation daily when my children lived at home – a parent needs to be a calm and helpful influence to young people. Now, I continue in that vein, even though it's just for me – it's part of my personality."* On vision and values, the same participant noted: *"I have given this a 5 on the slider given that my family are grown now, but if this was a question about my family when they were young, then my answer would be 10 and I thoroughly relate to the question."*

Parents also described the mental load of knowing, learning, and remembering, such as tracking school events and dietary needs. As one explained, *"My 2 children go to different schools which means different p.e days, swimming days, Christmas events, charity days, school dinner bookings etc the list of remembering for these days is endless"* (P18). In many cases, the cooperative dimensions of family life, especially navigating emotionally charged or conflicting needs, further intensified these labours. One parent remarked, *"Easy to switch off from work but difficult to control my anger sometimes and so I tend to shout. My daughter finds this annoying, especially when I argue with my husband"* (P24).

Taken together, these responses show that household composition, and in particular the presence or absence of children, significantly shapes the experience, visibility, and intensity of family management labour. While parenting amplifies these labours and brings emotional and practical complexity, cohabitation in general (with or without children) also intensifies tasks like planning, maintaining values, and regulating emotions. These findings suggest that domestic labour is not simply a matter of task execution, but is deeply relational and context-dependent.

4.10.3 ***Theme 3: Feeding – The Intersection of Care, Inclusion, and Well-being.*** Feeding emerged as one of the most vivid and complex domains in our data. While it aligned with the existing 'food' category in our taxonomy, participants' accounts revealed a much richer cognitive landscape. Beyond the routine tasks of planning and remembering preferences (*"Planning meals, thinking of likes, dislikes"* (P30)) feeding work was deeply entangled with personal values, emotional labour, and family relationships.

Participants described aligning their food practices with ethical and environmental commitments: *"I have values such as wanting to eat a predominantly vegetarian diet and using eco-friendly products in the home where possible"* (P42). For others, shared meals were crucial to maintaining emotional connection: *"I try to make time with my family to have a meal together"* (P33).

Many described researching health and dietary issues *"I do a lot of research on diet due to health requirements"* (P50); *"I read a good deal about the effects of food"* (P21) and strategising to meet constraints: *"It's a bit of a bore to plan meals... it has to be done as I like to save money"* (P42).

Feeding also required personalising meals *"my family don't have dietary needs but we all like different things"* (P33) and coordinating with shifting household routines: *"trying to juggle meals with food available, dietary preferences, people arriving unexpectedly, changing work locations, ability to get to the supermarket"* (P36).

Some participants curated special experiences, like themed or event meals that reflect tradition and lifestyle: *"decoration for Easter, Halloween, Christmas, to keep the traditions."* (P2). Others advocated for the needs of partners or children despite resistance: *"My partner struggles with her mental health."* (P46). Mediating conflicting preferences was another cognitive task: *"Mainly just remembering what each member of the household likes, prefers and compromising on that"* (P43).

Despite this complexity, participants rarely used domain-specific tools. Instead, they turned to general-purpose technologies such as Google, social media, calendars, reminders, and notes suggesting that feeding work is not only cognitively demanding but also under-supported in the breadth of its complexity by current digital systems.

As we explore in the findings for RQ1, some feeding activities, such as **strategising** and **coordinating**, align with previously identified cognitive tasks. However, our data also revealed novel behaviours within the feeding domain, including **researching**, **personalising**, **curating**, **advocating**, and **mediating**. These activities highlight the layered, value-driven, and emotionally attuned nature of feeding work that is potentially hidden from current technology design.

4.10.4 ***Theme 4: Finance: A Recognised and Digitally Supported Domain.*** Managing household finances emerged as another vivid domain in our data, with participants describing familiar activities that were closely linked to digital tools. For example, one participant explained, *"I am in control of the main bank account for*

the family and take responsibility for all bills and payments" (P6), using *"my banking app Monzo"* (P6). Participants commonly reported using banking apps, spreadsheets, and mobile apps to track spending. This close integration of technology with financial work may help explain why, compared to other domains, financial labour often felt both familiar and actionable.

Finance also surfaced in relation to memory work, such as remembering due dates and tracking expenses: *"Budgeting and planning ahead e.g. knowing when the car insurance and MOT is due, any big spend months etc."* (P48). Some participants even described a sense of pragmatism or satisfaction in managing these tasks: *"finances is something I actually enjoy"* (P13). Others linked finance to broader values, such as responsibility: *"Ensuring that we're smart with money at all times, never needing credit cards or getting into debt, and we save before buying something"* (P44). Financial planning was also tied to special events and holidays (*"I plan and organise finances for days/weekends away and holidays"* – P17). Yet for some, money management was a source of stress (*"I prefer dont think about money."* – P2).

Overall, financial labour stood out as the domain most consistently paired with digital tools. While not always enjoyable, it was seen as visible, actionable, and relatively well supported with technology enabling participants to approach it proactively and with a degree of control.

4.10.5 ***Theme 5: Special and Sensitive Contexts.*** In addition to everyday routines, participants described cognitive labour that emerges in non-routine, emotionally significant, or exceptional contexts. This theme encompasses managing special events, fostering inclusion within family life, and sustaining work-life balance. Although these areas differ in content, each requires deeply held values, careful coordination with others, and emotional and relational dynamics.

Regarding **special events**, participants detailed the planning and emotional orchestration required to create meaningful family occasions such as Christmas and birthdays. *"Buying for Christmas... presents, decorations, wrapping, posting, buying the Christmas tree and getting it home... ingredients needed for Christmas meals. Making the Christmas pudding/cake ahead of time"* (P21). These examples showed that managing special events is not merely practical but deeply intertwined with a desire to preserve cultural meaning and foster emotional connection.

In terms of **inclusion**, participants spoke about accommodating and supporting all family members, especially when a household includes a neurodivergent member. One participant described, *"Regulating my emotions from a hard day at work so as not to stress out my neurodivergent partner"* (P10). These accounts highlight the ongoing negotiation of emotional and environmental conditions to create a stable and inclusive household. Compared with broader themes of co-habiting and parenting, inclusion required more personalised and expert knowledge. This knowledge needed to be sourced, then applied through decision-making and monitoring.

Lastly, the labour of maintaining **work-life balance** was described as the effort to manage boundaries between professional and personal lives. Participants mentioned strategies such as separating work from personal time and ensuring smooth transitions between roles. For instance, one participant said, *"I separate my work life from my personal life"* (P5). Such efforts show that sustaining boundaries is a conscious, ongoing task integral to well-being.

Collectively, these accounts reveal dimensions of cognitive labour that, though less visible in daily routines, are deeply felt and carefully managed, requiring foresight, emotional labour, and sensitivity to others' needs and expectations. These special and sensitive contexts intensify the labours and appear to increase the need for specialist knowledge and skill even when the component tasks may appear routine.

4.10.6 ***Theme 6: Inclusion Through Everyday Self-Regulation.*** When asked about *self-regulation*, participants frequently described behaviours and decisions related to fostering inclusion within the household. Rather than enforcing individualistic self regulation routines, this labour often involved managing one's own actions to accommodate, soothe, or support others - especially those with neurodivergence, illness, or vulnerability.

The first behaviour, **Empathising**, involved efforts to understand and respond to emotional distress. One participant explained, *"When I see that my partner has stress after work we usually go for a walk at our favourite places. We try to discuss the reasons for the stress and I support him as best as I can"* (P2). Another important behaviour was **Assisting**, where participants provided direct physical or logistical support. For example, one noted, *"I have to take my partner to the toilet. I have to remind them to go to the toilet or they will soil themselves and stay in the mess without acknowledgement"* (P15). A further behaviour, **Reflecting**, captured the introspective work of managing one's own emotional state to foster a positive home environment. One participant remarked, *"I try to switch off from work, practise empathy and positive thinking, in order to create a happy home"* (P43). In addition, **Maintaining Control** was described as consciously suppressing one's own emotions, such as anger, to avoid distressing others, with one participant stating, *"I always try to act in a way that is homely to everyone in the household. One time I had to hide my anger and try correcting my daughter calmly over something terrible that she did"* (P1). Finally, the behaviour of **Reminding** involved prompting others who struggled with memory or task follow-through, as one participant detailed, *"My partner struggles to remember things and doesn't seem to have any urgency... I also plan around how she is feeling"* (P46). Collectively, these specific behaviours highlight that inclusion through everyday self-regulation is an ongoing process of emotional and behavioural management that sustains a supportive household environment.

5 Discussion

This study contributes to an emerging understanding of how digital tools intersect with the hidden labours of family management, as theorised by Robertson et al. [46]. While prior research has mapped and taxonomised these forms of labour, far less is known about how even ubiquitous tools such as shared calendaring systems, search engines, notes and list apps, messaging, and social media currently support, obscure, or reshape them. Our analysis surfaces uneven provision and the ways family managers improvise with general-purpose tools, revealing tensions between support, burden, and invisibility. By linking these lived accounts to established sociological constructs, the study offers HCI an empirically grounded starting point for understanding how participants describe digital

systems as intersecting with cognitive and emotional family work, and for identifying where current technologies may align with, overlook, or distort these labour forms.

We organise the discussion around four interrelated findings and identify directions and design considerations for future research. Together, these findings highlight areas where HCI can better support, augment or resist the reshaping of family management labour in the face of emerging technologies. First, **Digital Support for Meta-Labours** shows that while planning and monitoring map neatly onto available tools, more abstract and emotionally nuanced labours remain under-recognised and underserved. Second, **Meaning Making in Family Management** highlights that some forms of labour are meaningful or enjoyable, yet hybrid domains such as feeding, inclusion, and work-life balance carry hidden complexity and are poorly supported. Third, **From Coordination to Collaboration: Rethinking Cooperation** clarifies that cooperation in families depends on collaboration, not just coordination: coordination individualises responsibility, whereas collaboration scaffolds co-created norms, role negotiation, and shared accountability. Finally, **Family Crafting: Understanding the WHY of Domestic Labour** highlights accounts in which participants frame values-based labour as shaping other forms of family work. Taken together, these contributions extend HCI's understanding of family management labour by foregrounding its uneven technological support, its relational and affective dynamics, and the meta-labour of aligning everyday practice with long-term values.

5.1 Digital Support for Meta-Labours

Our results indicate that some types of family management labour are more consistently supported by digital tools than others. For instance, participants frequently reported using technology for the **Planning and Strategising** labour type, including calendars, search engines, and task management apps to coordinate activities and structure routines. Similarly, **Monitoring and Anticipating Needs** was often linked with a small but consistent set of tools, such as location trackers and banking apps. For **Knowing, Learning, and Remembering**, participants described relying on general-purpose technologies like notes, reminders, and to-do lists. This mirrors established HCI interests in task and information management [1, 28, 30, 52], where problems are well defined and tools widely available.

By contrast, forms of labour such as **Vision and Values (Meta-parenting), Managerial Thinking**, and **Self-Regulation** were associated with much lower and more fragmented levels of reported technology use. When digital tools were mentioned, they were often general-purpose applications applied opportunistically (e.g., searching values-driven content on social media or using wellness apps in the moment). Participants often described visible acts such as researching and personalising, activities that existing tools can support, yet our prompts targeted the underlying *meta-labour*. It was this meta-labour that participants typically did not enact with digital tools. The reasoning that organises these activities, aligning decisions with household values, boundary setting, and reflective judgement, was rarely treated as part of the "task" itself, echoing its treatment in recent AI research on housework automation [24].

Our findings also show that participants mainly relied on general-purpose informational tools (lists, calendars, search engines, messaging) rather than specialised automation. These are tools which appear to scaffold the informational environment around hidden labour, but they do not meaningfully reduce or restructure the underlying work. Whether this reflects participant preference, technological limitation, or a mismatch between tool capabilities and domestic needs remains an open question. For HCI, this raises a central design challenge that resonates with centaur versus cyborg models of human–AI collaboration [17]: which aspects of cognitive and emotional labour should remain human-led, which might benefit from augmentative or collaborative support, and what risks arise if future AI systems attempt to automate work that is deeply value-driven or relational?

This pattern suggests that support for these meta labours remains ad hoc and uneven, reliant on individual initiative rather than systematic technological provision. These more abstract and emotionally nuanced labours may also correspond to what Weeks and Ruppanner describe as "core" cognitive labours: ongoing, internal, and often invisible [63]. In contrast, "episodic" labours, such as maintenance or finance management, are more readily recognised and, whilst also underpinned by values, tend to rely on more transferable norms (for example financial wisdom), making them more likely to be addressed by digital solutions. Part of this disparity reflects wider gendered and commercial dynamics. As Sadowski [51] and Perez [41] argue, technological development in domestic contexts is often driven by commercial and institutional interests, meaning that labours with less obvious commercial or data value tend to be overlooked. The omission of these labours risks further obscuring them in everyday family life. While our reading of the data may be shaped by our positionality as practitioners with experience designing and evaluating digital tools, the observed gaps in our sample nonetheless suggest the need for a conceptual account of why support clusters around visible tasks while value and vision oriented meta-labours remain tacit and individually held.

5.1.1 *Design consideration: Interrogate the parts you can't see.*

When designing for seemingly well-structured planning or monitoring tasks, designers should attend to the meta-labours embedded within them, particularly the values work, meaning-making, and anticipatory judgement that precede visible action. For example, a system that streamlines the purchase of gifts (e.g., Amazon) may risk displacing or obscuring the substantial cognitive and emotional work involved in deciding what is appropriate, safe, aligned with family values, affordable, and socially considerate. Designing with awareness of these meta-labours can help avoid flattening them into simple transactions.

5.2 Meaning-Making in Family Management

Some participants described aspects of family management labour as enjoyable or empowering, challenging the assumption (perhaps shaped by our positionality) that such labour is only a burden to be minimised. We interpret these accounts as indications of ongoing meaning-making: the interpretive and relational work through which tasks acquire significance, identity, and connection. Enjoyment often arose when labour was visible, shared, or aligned with personal and household values, echoing Reich-Stiebert et al.'s [45]

multidimensional framing of mental load. Digital tools could mediate these experiences: shared calendars, trackers, and collaborative planning apps provided structure and visibility that sometimes fostered recognition and a sense of control.

Hybrid domains such as Feeding, Inclusion, Work-Life Balance, and Special Events were prominent sites of meaning-making. They combine routines, emotion, and culture, and were described as central and emotionally charged yet inconsistently supported by digital tools [14]. Their hybrid character helps explain this gap: by spanning multiple categories, they fall between the cracks of narrowly focused tools and conceptual frameworks, leaving families to rely on tacit judgement and ad hoc coordination.

Feeding practices, for example, were shaped by concerns for inclusion and health, while Special Events carried heightened cultural and emotional expectations. These cases illustrate how values and rituals intensify cognitive labour because decisions carry symbolic as well as practical weight, resonating with DeVault's account of food and family ritual [18] and with values-centred approaches in HCI [7]. At the same time, technologies that promise convenience or satisfaction can reframe meaning in ways that entrench norms or increase workload. As Cowan [12], Hackman [21], and Strengers [56] caution, framing or marketing domestic labour as "enjoyable" or "loving" can obscure that it remains unpaid and unequally distributed.

The entanglement of work and home life compounds these tensions. Leppäkumpu and Sivunen [34] show how managing work and nonwork boundaries involves fraught, relational negotiation. Flexible or home-based working can blur domains and increase pressure on family managers. Relatedly, Sadka and Antle [50] and Wadley et al. [62] call for socially grounded approaches to emotion regulation, noting that current tools often neglect interpersonal dynamics. Extending this critique, we treat meaning-making as a collective accomplishment: attempts to "add enjoyment" that individualise responsibility risk reinforcing hidden work, raising expectations, and generating new tasks rather than alleviating them.

Framing these accounts around meaning-making helps explain uneven support: where the symbolic stakes of a decision are high and negotiated, labour resists delegation and simple instrumentalisation; where criteria are explicit and shared, support is easier to provide.

5.2.1 ***Design consideration: Automate the crappy parts.*** Digital tools often replace the most meaningful or relational aspects of family life. For example entertaining or educating children with iPads, or digital breast pumps that replace the mother's role in breast feeding so she may work whilst leaving the least meaningful tasks such as laundry, repetitive preparation, and logistical coordination untouched. Designers might therefore consider which aspects of labour families would actually prefer to delegate, and which they may wish to preserve because they carry emotional or relational significance.

5.3 From Coordination to Collaboration: Rethinking Cooperation

We break down the concept of cooperation into *coordination* (allocating tasks, aligning schedules and information flows) and *collaboration* (co-authoring plans and norms, negotiating roles, and sharing accountability). Our data highlighted **Vision and Values** and **Self-Regulation** as especially dependent on collaborative cooperation, but inconsistently supported by technology. Notably, households lacking cooperative responsibilities were also those least aligned with these two of Robertson et al.'s labour types. This suggests that cooperation was described as central to family management labour, yet it remains framed and supported as coordination rather than collaboration in existing frameworks and technologies.

When considering the labour of Vision and Values, participants described activities such as researching information or curating resources, often entwined with boundary negotiation and empathy work. This relational nuance mirrors HCI and CSCW literature, where articulation work, the hidden coordination required in collective settings, provides a useful lens [55, 59]. However, articulation work typically foregrounds coordination of interdependent tasks; our accounts point to collaborative *sense-making* and shared norm-setting that exceed simple task alignment. Studies in care contexts similarly show overlaps, for example the invisible coordination involved in supporting others across institutional and interpersonal boundaries [35].

Similarly, Petsolari et al. [42] found that parents resisted AI systems that sought to replace parental roles, and instead valued tools that enhanced cooperation, communication, and emotional care. This echoes our findings that participants wanted technologies to support shared family dynamics rather than only individual tasks, a collaborative substrate rather than a coordinated handoff.

Cooperation also featured heavily in our analysis of Self-Regulation, particularly in *Theme 6: Inclusion Through Everyday Self-Regulation*. Robertson et al. define self-regulation as "the cognitive work involved in managing one's behaviours and maintaining one's own health and equilibrium for the sake of the family" [46, p.194]. Participants described practices such as soothing oneself, managing emotional outbursts, and preparing for difficult situations, typically in service of family wellbeing, especially in contexts involving neurodivergence or work life balance. These are performed *for and with* others, indicating collaborative intent even when the act appears individual.

While some participants reported using wellness apps or digital media like music, these tools were general-purpose. They supported component acts, such as emotional self-soothing or seeking inspirational content, but rendered the relational intent invisible, treating the work as an individual task to be coordinated. As discussed in the background section of this paper, emotional labour of this kind is often invisible, gendered, and marginalised [21]. Our data suggest that these practices are central to family functioning yet are framed by technologies in individualistic, coordination-centric terms.

Participants' responses also introduced descriptors for this labour, including empathising and enforcing boundaries. These do not appear in Reich-Stiebert et al.'s taxonomy of gendered mental load [45], perhaps because they sit at the intersection of emotional and cognitive work. They also overlap with research on emotional labour [21] and studies of home-based work and boundary management [8, 11, 48].

Sadka and Antle [50] review technologies for emotion regulation and highlight persistent gaps in supporting social and relational aspects. Similarly, Wadley et al. [62] stress the importance of drawing from psychological models and identify social interaction as a

critical but underexplored domain. Taken together, these accounts indicate that treating relational family work as coordination preserves its individualised character; a collaboration lens foregrounds shared authorship, negotiation, and mutual accountability that current tools rarely represent.

We therefore read *cooperation* as the foundation of family management, and *collaboration* (rather than coordination) as the unit that better captures how Vision and Values and Self-Regulation are enacted. This distinction helps explain why support remains uneven or confused and suggests better scaffolding opportunities for innovation.

5.3.1 ***Design consideration: Avoid accidental individualisation.*** Digital systems can inadvertently centralise domestic information and decision-making around a single family manager. Meal-planning and grocery apps offer a clear example: although they technically support shared lists or collaborative planning, in practice one person often becomes responsible for selecting meals, balancing dietary constraints, monitoring allergies, budgeting, accommodating sensory needs, interpreting health goals, and aligning choices with family values such as sustainability or cultural preferences. This person becomes the "keeper of context," carrying the invisible work needed to make a meal "right" for the household. Designers may therefore consider how tools can support shared visibility, intentional collaboration, and consensual redistribution of context, rather than reinforcing individual burden.

5.4 Family Crafting: Understanding the WHY of Domestic Labour

The most prominent emergent labour in our study was **Vision and Values**, termed *Metaparenting* by Robertson et al. [46] (drawing on Holden and Hawk [33]). We broaden this to **Life-Crafting** to capture relevance beyond parenting and to name the work of making explicit the "why" that underpins everyday decisions: articulating what matters, how trade-offs are judged, and what a household is aiming for over time.

We propose reframing this as **Life-Crafting** (or Family Crafting), a term that captures its multidimensional nature (emotional, cognitive, philosophical) and links it to adjacent literatures such as Life-Crafting [61], Job Crafting [38], and Conservation of Resources theory [22]. These perspectives similarly position individuals as active agents shaping roles, environments, and futures through reflective, goal-directed strategies.

Life-Crafting is related to, but distinct from, several established constructs in HCI and sociology. Where existing constructs attend to the coordination, identity, or care dynamics of domestic life, none explicitly theorise the normative, value setting work that organises these actions. Life-Crafting makes this dimension visible and analytically available as a distinct form of family management labour. Articulation work [55, 59] focuses on coordinating and knitting together interdependent tasks; Life-Crafting, by contrast, foregrounds the normative work of deciding what a household is aiming for, and which tasks count as "good enough" in the first place. Identity work [19, 53] examines how people present and sustain selves or roles; Life-Crafting instead centres the ongoing negotiation of shared household values, which may cut across individual identities and require compromise. Care work and emotional labour traditions [21, 26] highlight the affective effort of soothing, tending and supporting others; Life-Crafting builds on this by making explicit the value frameworks (for example dignity, inclusion, non-punitive parenting) that organise which caring actions are seen as appropriate or necessary. In short, we use Life-Crafting to name a value-driven, future-oriented meta-labour at the household level, rather than coordination, self-presentation or care practices alone.

Despite being richly articulated, participants rarely linked Life-Crafting to digital tools. Mentions were scattered across general-purpose platforms (e.g. search engines, note apps, spreadsheets) rather than consistent or purpose-built supports. Activities such as enforcing boundaries or mediating conflicting needs did not align with existing taxonomies in our content analysis, underlining the relative novelty and invisibility of this labour in existing conceptual frameworks [16, 45].

As seen in *Theme 5: Special and Sensitive Contexts* and *Theme 3: Feeding*, Life-Crafting surfaced most vividly in emotionally charged contexts (e.g. neurodivergence, inclusive events, transitions between work and home). In these moments, participants enacted and communicated values as the foundation for decision-making, the "why" that made practical choices intelligible to others.

Life-Crafting spans activities such as planning, anticipating, decision-making, and reflection, often overlapping with other labour types. This distribution underlines its *meta* character: the "why" coordinates and anchors the "what." Without it, work risks becoming fragmented and harder to delegate, exacerbating cognitive load and inequities, as also highlighted in *Theme 2* on household composition.

Concerns about technology are echoed in research showing parents' caution toward AI when tools risk undermining trust, authority, or context sensitivity [42]. This mirrors participants' limited use of digital supports for Life-Crafting, suggesting that poorly aligned tools could increase rather than alleviate pressures.

Yet Life-Crafting also offered potential for joy, creativity, and identity formation. As seen in *Theme 1: Varied Enjoyment*, some participants described management as empowering. Empowerment most often appeared when the rationale for action was shared and recognised. Life-Crafting in particular may reduce fragmentation while enabling self-expression and meaning-making.

Future research could explore how technologies might articulate and externalise family values in supportive rather than prescriptive ways. For example, could large language models (LLMs) help generate shared value statements, curate principles across domains (e.g. food, inclusion, behavioural norms), and scaffold reflection? These tools could ease sole decision-making and enable more equitable responsibility-sharing, if designed carefully to avoid reproducing gendered dynamics. Building on Strengers and Kennedy [56], queer and inclusive design methods may further help reimagine not only labour distribution but how family itself is conceptualised.

These insights prompt concrete questions for future systems design: how to make hidden work visible without increasing it, how to support cooperation rather than individualise responsibility, and how to respect values-based life-crafting while avoiding new inequities or forms of unseen labour.

5.4.1 ***Design consideration: Understand and centralise the 'why' without automating it.*** Technologies are well suited to

organising the how and the what of domestic action, but the why needs to be kept central and human rather than automated. In families supporting a neurodivergent child, for example, decisions about routines, transitions or sensory environments might be guided by commitments to dignity, autonomy and non-punitive care. If digital tools infer their own goals from usage data or generic behavioural models, they may start to optimise for compliance or efficiency in ways that conflict with these values. Instead of generating or adjusting the "right" goals on behalf of families, systems could help people to articulate, record and share the reasons that matter to them, and to use those reasons as a visible reference point for everyday decisions. In this way, technology can help centralise the why without taking ownership of it.

6 Limitations and Future Work

This study's primary limitation was its reliance on a survey format. While this enabled a broad and diverse sample, it restricted our ability to probe how cognitive and emotional labours unfold in practice. As the first study in a broader programme of work, the survey was designed to map the breadth of family management labour and its technological mediation, providing a baseline contribution that later qualitative studies can deepen rather than replace. We could not fully explore the situated use of technologies, their emotional impact, or the ways they support or complicate family work. We did not measure digital literacy directly, so our analysis reflects participants' own accounts of the tools they use rather than a calibrated assessment of technological skill or access. To help participants reflect on the often abstract nature of hidden labours, we provided prompts and examples in our descriptions (see Appendix A and Appendix B). While necessary, these may also have introduced framing effects by foregrounding certain interpretations of the work. In particular, although we deliberately used a mix of digital and non-digital probe images, several examples still depicted visible or already-digitised tasks. This may have unintentionally foregrounded more instrumental aspects of family work and introduced a framing effect that made subtle relational or affective labour less likely to be volunteered unprompted.

Because this was a one-time, self-reported survey, it cannot capture the more tacit, bodily, or evolving aspects of cognitive and emotional labour. It also does not cover every nuance of the sociological taxonomies we use; it reflects how participants describe this work, rather than the fine-grained dynamics that ethnographic studies can show. We also did not apply any time-based exclusion criteria, which in hindsight might have provided an extra safeguard. In practice, requiring participants to complete all six labour sections was largely sufficient, as the vast majority of included responses were of a reasonable length and completion time. Our claims therefore focus on participants' reflective accounts rather than the full situated enactment of these practices.

We also acknowledge that, although we ensured diversity in household structure and socioeconomic background, our design did not support meaningful engagement with how differently situated households experience family labour. Domestic norms, family roles, and labour expectations are culturally and socially contingent, and this limits the standpoint our findings can speak from. Future work requires qualitative and participatory approaches (e.g. interviews, diaries, ethnography, or co-design) that can surface pluralism, lived inequality, and contextual variation, particularly in relation to Life-Crafting and self-regulation, where reflections were highly individualised. Such work would be better positioned to attend to how cultural and social histories shape the visibility, distribution, and technological mediation of family management labour.

Our retrospective focus on currently used technologies also left emerging practices and speculative possibilities out of scope. As AI systems increasingly enter the domestic sphere, it is vital to understand not only how they are adopted but also how they are imagined, resisted, or negotiated, particularly in relation to hidden or value-driven forms of labour that may not be immediately automatable. Speculative methods such as design fictions could help surface these perceptions, illuminating both potential utility and harm in AI-driven family management tools.

Our findings highlight several directions for further inquiry. One is to investigate the meta-labour of Life-Crafting, the reflective, values-based work that sustains coherence and transferability across domains. Future studies could explore how co-designed tools, including large language models (LLMs), might externalise and support this labour by articulating shared values, curating domain-specific principles, and enabling collaborative reflection. Such approaches must balance assistance with sensitivity, avoiding intrusion or the reinforcement of gendered inequities.

Other promising lines of inquiry include: examining how feeding practices expose the layered interplay of care, inclusion, and wellbeing; testing how digital tools might enhance the enjoyment and visibility of family management without trivialising its demands; and deepening our understanding of cooperative labour through CSCW concepts such as articulation work. Each direction opens opportunities to surface and support hidden domestic labours by adapting tools from adjacent domains or engaging new institutional and commercial stakeholders.

Finally, our analysis is shaped by our positionality as feminist researchers committed to improving domestic life through technology. These values led us to foreground supportive tools rather than approaches that centred on non-use. We also worked within a pre-existing taxonomy of family management labour, which, while useful, may have constrained our interpretations. Future research could extend this work through alternative frameworks and participatory approaches that centre the framings and values of family managers themselves.

7 Conclusion

This paper examined how digital technologies relate to six forms of family management labour and how participants describe enacting them. We found uneven support across these labours: participants reported that tools supported some activities (for example organising and monitoring) but left gaps elsewhere. Tasks tied to external institutions such as finance and health benefited from calendars, compliance requirements, reminders, and dedicated portals. By contrast, domains like inclusion, special events, and work-life balance lacked these outside anchors. Instead, they relied on tacit judgement, memory, and ad hoc coordination, leaving participants without clear digital support. Building on prior work, we surface

Life-Crafting (household vision and values) and Self-Regulation as consequential yet weakly supported sites for research and innovation. Both resist delegation because they are implicit, value-laden, and highly context sensitive, which pushes people towards improvised, individual strategies rather than shared ones. While family management is cooperative, especially around feeding and emotional regulation, the tools participants used were commonly individualised. We contribute a preliminary empirical mapping of digital support and gaps across these labours, and suggest directions for future research that explores how collaborative domestic technologies could make meta labour visible, shareable, and negotiated across roles, supporting fairer distribution without over-formalising family life. These insights invite HCI to treat values and self-regulation as part of everyday coordination and to design for collaboration and equity, while recognising that some of this work is also experienced as meaningful.

8 AI assistance:

The authors made limited use of AI tools for language editing, to resolve minor LaTeX formatting issues, and to generate illustrative example materials (e.g., image probes) used to demonstrate concepts. All substantive content, analysis, and arguments were developed by the authors.

Acknowledgments

We are grateful to the participants who generously shared their experiences of family management, and to friends and colleagues who offered feedback on early drafts. We also acknowledge all those who have carried hidden domestic labour in silence, as well as those who have worked to surface and contest it, including the scholars whose work has shaped and inspired this study.

References

[1] Yoana Ahmetoglu, Duncan Brumby, and Anna Cox. 2024. Bridging the Gap Between Time Management Research and Task Management App Design: A Study on the Integration of Planning Fallacy Mitigation Strategies. In *Proceedings of the 3rd Annual Meeting of the Symposium on Human-Computer Interaction for Work (CHIWORK '24)*. Association for Computing Machinery, New York, NY, USA, 1–14. https://doi.org/10.1145/3663384.3663404

[2] Francesco Cosimo Andriulo, Marco Fiore, Marina Mongiello, Emanuele Traversa, and Vera Zizzo. 2024. Edge Computing and Cloud Computing for Internet of Things: A Review. *Informatics* 11, 4 (Dec. 2024), 71. https://doi.org/10.3390/informatics11040071

[3] Arne Berger, Albrecht Kurze, Andreas Bischof, Jesse Josua Benjamin, Richmond Y. Wong, and Nick Merrill. 2023. Accidentally Evil: On Questionable Values in Smart Home Co-Design. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23)*. Association for Computing Machinery, New York, NY, USA, 1–14. https://doi.org/10.1145/3544548.3581504

[4] Virginia Braun and Victoria Clarke. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3, 2 (Jan. 2006), 77–101. https://doi.org/10.1191/1478088706qp063oa

[5] A. J. Brush and Tammara Combs Turner. 2007. A Survey of Personal and Household Scheduling Practices - Implications for Digital Family Calendars. (March 2007). https://www.microsoft.com/en-us/research/publication/a-survey-of-personal-and-household-scheduling-practices-implications-for-digital-family-calendars/

[6] Rebecca Buchanan. 2018. 'Third wave feminism has led us to want to be EVERYTHING, amazing mothers, incredible professionals, perfect partners': British Female Academics and the Politics of Reproduction. *Brief Encounters* 2, 1 (Jan. 2018). https://doi.org/10.24134/be.v2i1.112

[7] Sarah E. Carter. 2022. A Value-centered Exploration of Data Privacy and Personalized Privacy Assistants. *Digital Society* 1, 3 (Nov. 2022), 27. https://doi.org/10.1007/s44206-022-00028-w Number: 3.

[8] Janghee Cho and Stephen Voida. 2024. Toward More Inclusive and Accessible Futures of Remote Work Using a Feminist Geographical Lens. In *Proceedings of the 3rd Annual Meeting of the Symposium on Human-Computer Interaction for Work*. ACM, Newcastle upon Tyne United Kingdom, 1–10. https://doi.org/10.1145/3663384.3663392

[9] Lucia Ciciolla and Suniya S. Luthar. 2019. Invisible Household Labor and Ramifications for Adjustment: Mothers as Captains of Households. *Sex Roles* 81, 7 (Oct. 2019), 467–486. https://doi.org/10.1007/s11199-018-1001-x

[10] Sue Campbell Clark. 2000. Work/Family Border Theory: A New Theory of Work/Family Balance. *Human Relations* 53, 6 (June 2000), 747–770. https://doi.org/10.1177/0018726700536001

[11] Emily I.M. Collins, Anna L. Cox, and Ruby Wootton. 2015. Out of Work, Out of Mind?: Smartphone Use and Work-Life Boundaries. *Int. J. Mob. Hum. Comput. Interact.* 7, 3 (July 2015), 67–77. https://doi.org/10.4018/ijmhci.2015070105 Number: 3.

[12] Ruth Schwartz Cowan. 1983. *More work for mother*. Basic Books.

[13] Andy Crabtree, Terry Hemmings, Tom Rodden, Keith Cheverst, Karen Clarke, and Mark Rouncefield. 2002. Probing For Information. In *Proceedings of the 2nd EQUATOR Conference*. 1–8.

[14] Allison Daminger. 2019. The Cognitive Dimension of Household Labor. *American Sociological Review* 84, 4 (Aug. 2019), 609–633. https://doi.org/10.1177/0003122419859007

[15] Allison Daminger. 2020. De-gendered Processes, Gendered Outcomes: How Egalitarian Couples Make Sense of Non-egalitarian Household Practices. *American Sociological Review* 85, 5 (Oct. 2020), 806–829. https://doi.org/10.1177/0003122420950208

[16] Allison P. Daminger. 2022. Thinking Gender: The Cognitive Dimensions of Household Labor. (June 2022). https://nrs.harvard.edu/URN-3:HUL.INSTREPOS:37371914

[17] Fabrizio Dell'Acqua, Edward McFowland III, Ethan R. Mollick, Hila Lifshitz-Assaf, Katherine Kellogg, Saran Rajendran, Lisa Krayer, François Candelon, and Karim R. Lakhani. 2023. Navigating the Jagged Technological Frontier: Field Experimental Evidence of the Effects of AI on Knowledge Worker Productivity and Quality. https://doi.org/10.2139/ssrn.4573321

[18] Marjorie L. DeVault. 1991. *Feeding the Family: The Social Organization of Caring as Gendered Work*. University of Chicago Press.

[19] Erving Goffman. 1959. *The Presentation of Self in Everyday Life*. Penguin. https://www.penguin.co.uk/books/13511/the-presentation-of-self-in-everyday-life-by-erving-goffman/9780241547991

[20] James J. Gross. 2015. The Extended Process Model of Emotion Regulation: Elaborations, Applications, and Future Directions. *Psychological Inquiry* 26, 1 (Jan. 2015), 130–137. https://doi.org/10.1080/1047840X.2015.989751 _eprint: https://doi.org/10.1080/1047840X.2015.989751.

[21] Rose Hackman. 2023. *Emotional Labor: The Invisible Work Shaping Our Lives and How to Claim Our Power*. Flatiron Books.

[22] Jonathon R. B. Halbesleben, Jean-Pierre Neveu, Samantha C. Paustian-Underdahl, and Mina Westman. 2014. Getting to the "COR": Understanding the Role of Resources in Conservation of Resources Theory. *Journal of Management* 40, 5 (July 2014), 1334–1364. https://doi.org/10.1177/0149206314527130

[23] Andreas Haupt and Dafna Gelbgiser. 2022. The Gendered Division of Cognitive Household Labor, Mental Load, and Family-Work Conflict in European Countries. https://doi.org/10.31235/osf.io/tsfu6

[24] Ekaterina Hertog, Setsuya Fukuda, Rikiya Matsukura, Nobuko Nagase, and Vili Lehdonvirta. 2023. The future of unpaid work: Estimating the effects of automation on time spent on housework and care work in Japan and the UK. *Technological Forecasting and Social Change* 191 (June 2023), 122443. https://doi.org/10.1016/j.techfore.2023.122443

[25] Helen Hester and Nick Srnicek. 2023. *After Work: A History of the Home and the Fight for Free Time*. Verso Books. Google-Books-ID: Bw6xDwAAQBAJ.

[26] Arlie Russell Hochschild. 2022. The Managed Heart. In *Working in America* (5 ed.). Routledge. Num Pages: 9.

[27] Kathleen E. Hull and Timothy A. Ortyl. 2019. Conventional and Cutting-Edge: Definitions of Family in LGBT Communities. *Sexuality Research and Social Policy* 16, 1 (March 2019), 31–43. https://doi.org/10.1007/s13178-018-0324-2

[28] William Jones, Jesse David Dinneen, Robert Capra, Anne R. Diekema, and Manuel A. Pérez-Quiñones. 2021. Personal Information Management. https://doi.org/10.48550/arXiv.2107.03291 arXiv:2107.03291.

[29] Bryan Kalms. 2008. *Living with information : the household as a negotiated information system : an exploratory study*. Thesis. UNSW Sydney. https://doi.org/10.26190/unsworks/18699

[30] A. Kamsin. 2014. *Improving Tool Support for Personal Task Management (PTM)*. Doctoral. UCL (University College London). https://discovery.ucl.ac.uk/id/eprint/1450430/

[31] Jenny Kennedy, Bjorn Nansen, Michael Arnold, Rowan Wilken, and Martin Gibbs. 2015. Digital housekeepers and domestic expertise in the networked home. *Convergence* 21, 4 (Nov. 2015), 408–422. https://doi.org/10.1177/1354856515579848 Number: 4.

[32] Ellen Ernst Kossek, Marian N. Ruderman, Phillip W. Braddy, and Kelly M. Hannum. 2012. Work–nonwork boundary management profiles: A person-centered approach. *Journal of Vocational Behavior* 81, 1 (Aug. 2012), 112–128.

https://doi.org/10.1016/j.jvb.2012.04.003 Number: 1.
[33] Leon Kuczynski. 2003. *Handbook of Dynamics in Parent-Child Relations*. SAGE. Google-Books-ID: YlwyBRqG98kC.
[34] Jonna Leppäkumpu, , and Anu Sivunen. 2023. Communicating across the borders: managing work-life boundaries through communication in various domains. *Community, Work & Family* 26, 2 (March 2023), 222–241. https://doi.org/10.1080/13668803.2021.1952163 _eprint: https://doi.org/10.1080/13668803.2021.1952163.
[35] Doris Lydahl. 2017. Visible persons, invisible work?: Exploring articulation work in the implementation of person-centred care on a hospital ward. *Sociologisk Forskning* 54, 3 (Sept. 2017), 163–179. https://doi.org/10.37062/sf.54.18213
[36] J Manning. 2020. Queering family communication. In *Navigating Relationships in the Modern Family: Communication, Identity, and Difference*. Peter Lang, 69–95.
[37] Philipp Mayring. 2021. Qualitative Content Analysis : A Step-by-Step Guide. (2021), 1–100. https://www.torrossa.com/it/resources/an/5282250
[38] Tulika Mukherjee and Rajib L. Dhar. 2023. Unraveling the black box of job crafting interventions: A systematic literature review and future prospects. *Applied Psychology* 72, 3 (July 2023), 1270–1323. https://doi.org/10.1111/apps.12434
[39] Carman Neustaedter and A. J. Bernheim Brush. 2006. "LINC-ing" the family: the participatory design of an inkable family calendar. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '06)*. Association for Computing Machinery, New York, NY, USA, 141–150. https://doi.org/10.1145/1124772.1124796
[40] Shira Offer. 2014. The Costs of Thinking About Work and Family: Mental Labor, Work–Family Spillover, and Gender Inequality Among Parents in Dual-Earner Families. *Sociological Forum* 29, 4 (2014), 916–936. https://doi.org/10.1111/socf.12126 _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/socf.12126.
[41] Caroline Criado Perez. 2019. *Invisible Women: Exposing Data Bias in a World Designed for Men* (1st edition ed.). Chatto & Windus, London.
[42] Melina Petsolari, Seray B Ibrahim, and Petr Slovak. 2024. Socio-technical Imaginaries: Envisioning and Understanding AI Parenting Supports through Design Fiction. In *Proceedings of the CHI Conference on Human Factors in Computing Systems*. ACM, Honolulu HI USA, 1–27. https://doi.org/10.1145/3613904.3642619
[43] Catherine Plaisant, Aaron Clamage, Hilary Browne Hutchinson, Benjamin B. Bederson, and Allison Druin. 2006. Shared family calendars: Promoting symmetry and accessibility. *ACM Trans. Comput.-Hum. Interact.* 13, 3 (Sept. 2006), 313–346. https://doi.org/10.1145/1183456.1183458
[44] Noopur Raval. 2021. Interrupting invisibility in a global world. *Interactions* 28, 4 (July 2021), 27–31. https://doi.org/10.1145/3469257
[45] Natalia Reich-Stiebert, Laura Froehlich, and Jan-Bennet Voltmer. 2023. Gendered Mental Labor: A Systematic Literature Review on the Cognitive Dimension of Unpaid Work Within the Household and Childcare. *Sex Roles* 88, 11-12 (April 2023), 475. https://doi.org/10.1007/s11199-023-01362-0
[46] Lindsey G. Robertson, Tamara L. Anderson, M. Elizabeth Lewis Hall, and Christina Lee Kim. 2019. Mothers and Mental Labor: A Phenomenological Focus Group Study of Family-Related Thinking Work. *Psychology of Women Quarterly* 43, 2 (June 2019), 184–200. https://doi.org/10.1177/0361684319825581
[47] Kayleigh Rosewell. 2022. Academics' perceptions of what it means to be both a parent and an academic: perspectives from an English university. *Higher Education* 83, 4 (April 2022), 711–727. https://doi.org/10.1007/s10734-021-00697-5 Number: 4.
[48] Anna Rudnicka, Joseph W. Newbold, Dave Cook, Marta E. Cecchinato, Sandy J. J. Gould, and Anna L. Cox. 2020. Eworklife: developing effective strategies for remote working during the COVID-19 pandemic. In *The new future of work online symposium*. https://www.microsoft.com/en-us/research/publication/eworklife-developing-effective-strategies-for-remote-working-during-the-covid-19-pandemic/
[49] Leah Ruppanner. 2020. *Motherlands: How States Push Mothers Out of Employment* (1st edition ed.). Temple University Press.
[50] Ofir Sadka and Alissa Antle. 2022. Interactive Technologies for Emotion Regulation Training: A Scoping Review. *International Journal of Human-Computer Studies* 168 (Dec. 2022), 102906. https://doi.org/10.1016/j.ijhcs.2022.102906
[51] Jathan Sadowski, Yolande Strengers, and Jenny Kennedy. 2024. More work for Big Mother: Revaluing care and control in smart homes. *Environment and Planning A: Economy and Space* 56, 1 (Feb. 2024), 330–345. https://doi.org/10.1177/0308518X211022366
[52] Shruti Sannon, Mihaela Vorvoreanu, Kathleen Walker, and Adam Fourney. 2020. "Am I doing this all wrong?": Challenges and Opportunities in Family Information Management. *Proceedings of the ACM on Human-Computer Interaction* 4, CSCW2 (Oct. 2020), 138:1–138:28. https://doi.org/10.1145/3415209
[53] David A. Snow and Leon Anderson. 1987. Identity Work Among the Homeless: The Verbal Construction and Avowal of Personal Identities. *Amer. J. Sociology* (May 1987). https://doi.org/10.1086/228668
[54] Niloofar Solhjoo, Maja Krtalić, and Anne Goulding. 2022. Pets and people: information experience of multispecies families. *Journal of Documentation* 78, 5 (Aug. 2022), 1092–1108. https://doi.org/10.1108/JD-03-2021-0052
[55] Susan Leigh Star and Anselm Strauss. 1999. Layers of Silence, Arenas of Voice: The Ecology of Visible and Invisible Work. (1999).
[56] Yolande Strengers and Jenny Kennedy. 2021. *The Smart Wife: Why Siri, Alexa, and Other Smart Home Devices Need a Feminist Reboot*. MIT Press.
[57] Yolande Strengers and Larissa Nicholls. 2018. Aesthetic pleasures and gendered tech-work in the 21st-century smart home. *Media International Australia* 166, 1 (Feb. 2018), 70–80. https://doi.org/10.1177/1329878X17737661 Number: 1.
[58] Lucy Suchman. 1995. Making work visible. *Commun. ACM* 38, 9 (Sept. 1995), 56–64. https://doi.org/10.1145/223248.223263
[59] Lucy Suchman. 1996. Supporting Articulation Work. In *Computerization and Controversy*. Elsevier, 407–423. https://doi.org/10.1016/B978-0-12-415040-9.50118-4
[60] Fiona Tasker and Charlotte J. Patterson. 2007. Research on Gay and Lesbian Parenting: Retrospect and Prospect. *Journal of GLBT Family Studies* 3, 2-3 (Feb. 2007), 9–34. https://doi.org/10.1300/J461v03n02_02
[61] Llewellyn E. van Zyl, Noah C. M. Custers, Bryan J. Dik, Leoni van der Vaart, and Jeff Klibert. 2023. The Holistic Life-Crafting Model: a systematic literature review of meaning-making behaviors. *Frontiers in Psychology* 14 (Nov. 2023). https://doi.org/10.3389/fpsyg.2023.1271188
[62] Greg Wadley, Wally Smith, Peter Koval, and James J. Gross. 2020. Digital Emotion Regulation. *Current Directions in Psychological Science* 29, 4 (Aug. 2020), 412–418. https://doi.org/10.1177/0963721420920592
[63] Ana Catalano Weeks and Leah Ruppanner. 2024. A typology of US parents' mental loads: Core and episodic cognitive labor. *Journal of Marriage and Family* n/a, n/a (2024). https://doi.org/10.1111/jomf.13057 _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/jomf.13057.
[64] Nicole E. Werner, Anna F. Jolliff, Gail Casper, Thomas Martell, and Kevin Ponto. 2018. Home is where the head is: a distributed cognition account of personal health information management in the home among those with chronic illness. *Ergonomics* 61, 8 (Aug. 2018), 1065–1078. https://doi.org/10.1080/00140139.2018.1435910
[65] Rebecca Whiting and Gillian Symon. 2020. Digi-Housekeeping: The Invisible Work of Flexibility. *Work, Employment and Society* 34, 6 (Dec. 2020), 1079–1096. https://doi.org/10.1177/0950017020916192 Number: 6.

Appendix A Survey Structure and Coding Overview

Component	Description	Examples (from survey text)
Demographics & Household Context	Demographic and household questions establishing who the respondent is and their role in the home.	Age band; gender; education; employment status; household size; number under 18; relationship status; living with a partner; caring responsibilities; self-identified role in household management.
Introduction to Types of Labour	Introductory text explaining that the next section asks about different types of cognitive labour in the home.	"Next we will ask you about a series of types of cognitive labour."
Labour type: Planning and strategising	Plain-language description of planning and strategising, including anticipatory and "how-to" work.	"This includes time management, planning family activities, researching and developing 'how to' plans for home life and contingency planning."
Labour type: Monitoring and anticipating needs	Description of ongoing monitoring of people and resources.	"This includes monitoring resources (e.g., money, food) or monitoring children or pet's whereabouts."
Labour type: Family vision and values	Description of shaping a shared vision and values for home life.	"The vision is the underlying aspirations for how life should be living in your home... Values such as being environmentally friendly and healthy, vegetarian or vegan, or keeping family close through shared activities and routines"
Labour type: Knowing (learning and remembering)	Description of learning about household members and remembering needs in context.	"Learning about your household members needs as well as testing and iterating this knowledge. Remembering all the needs on time and in context."
Labour type: Managerial thinking (delegating and instructing)	Description of "management" work as though running the home like a business.	"This work includes orchestrating, evaluating, delegating everything from finances to meals as though you were the manager of your home if your home was a business."
Labour type: Self-regulation	Description of regulating one's own emotions and behaviour in the best interests of the family.	"Regulating your own emotions and behaviour in the best interest of the family. Mental preparation, cognitive and emotional regulation strategies."
Relatability rating (per labour type)	Slider item measuring how strongly participants relate to each labour type.	"How strongly do you relate to this type of mental labour in your daily life?" (slider).
Responsibility attribution (per labour type)	Multiple-choice question about who is primarily responsible for the work.	Options: "Me – I'm the only one in my household"; "Me – and I live with others"; "My partner"; "Equally shared"; "I do not relate to this type of labour."
Salient example (open text; all labour types)	For each labour type, participants who related to it were asked to describe a salient example; those who did not relate were asked why.	"You have said you do relate to this – can you describe an example of this labour from your own life that stands out the most to you?" / "You have said you don't relate to this – why?"
Technology use (per labour type)	Open-text question asking about any technologies used to support the labour type.	"If you currently use any technologies to support this type of work please can you give details?"
Technology burden (per labour type)	Open-text question asking whether technologies create additional labour.	"Do any of the technologies you have described create additional work for you? If so how?"
End-of-survey reflection: visibility	Slider on how visible the explored labours are within the household.	"How visible do you think the labours we have explored in this survey are in your household?"
Coding logic (analysis)	How responses were analysed. Summarised here; detailed in Methods.	Open-text responses were mapped to the six labour domains and thematically coded to identify patterns in practices, emotions, and technology use; technology mentions coded and situated by domain. (As described in 4.4 Analysis.)
Exclusion criteria	Only exclusion rule: submissions had to complete all six labour sections; 11 of 61 submissions were excluded.	Final analytic sample: N = 50.

Appendix B Other visual probes - spanning digital and non-digital examples

Figure 3: Visual probe illustrating the concept of knowing, learning, and remembering, using examples of everyday reminders and shared understandings of healthy balance. Example materials generated by the authors using GPT-4.

Figure 4: Visual probe illustrating the concept of managerial thinking using examples of a physical kanban style family organiser. Example materials generated by the authors using GPT-4.

Figure 5: Visual probe illustrating the concept of Planning and Strategising, using examples of dog training advice and an app for planning a family day out. Example materials generated by the authors using GPT-4.