Mental Health and Digital Technologies

Family digital mental health interventions: aligning design and systemic practice principles

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Received 21 March 2026
Revised 3 June 2026
Accepted 15 July 2026

Abstract

Purpose – Digital mental health interventions designed for individuals are rapidly expanding and demonstrate increasing evidence of effectiveness. Despite the central role families play in supporting individuals experiencing mental health challenges, there is a notable lack of digital interventions designed for use by family groups, alongside limited examination of the theoretical foundations informing their design. This paper aims to address this gap by exploring how systemic psychotherapy principles can inform the development of family-oriented digital mental health interventions.

Design/methodology/approach – The paper undertakes a conceptual analysis comparing the theories of change underpinning individual psychotherapies with those central to systemic psychotherapies. It examines the implications of these theoretical differences for the design of digital mental health interventions supporting family engagement.

Findings – The analysis demonstrates that systemic psychotherapies, focusing on relationships and interactional processes rather than individual symptom reduction, cannot be meaningfully translated into digital formats by simply adapting individually oriented interventions. Instead, family-centred digital interventions require bespoke design characteristics. The paper identifies key conceptual considerations and offers design-informed recommendations to guide the development of systemically informed digital platforms.

Originality/value – This paper contributes novel theoretical insights by explicitly linking systemic psychotherapy models with digital intervention design. It advances understanding of how relational theories of change can inform the creation of digital mental health resources for families, an area that remains underexplored in both digital mental health and systemic psychotherapy literature.

Keywords Digital mental health, Family therapy, Systemic psychotherapy, Relational health, Intervention design, Digital health innovation

Paper type Practitioner paper

Mental Health and Digital Technologies
Emerald Publishing Limited
2976-8756
DOI 10.1108/MHDT-03-2026-0021

Introduction

There is an abundance of digital mental health interventions (DMHIs) for individuals experiencing a range of mental health challenges (De Witte *et al.*, 2021; Philippe *et al.*, 2022; Plessen *et al.*, 2025). The vast majority of those are based on individual psychotherapy treatments, which have demonstrated efficacy in traditional mental health care settings, typically represented as a direct translation of face-to-face strategies (Mohr *et al.*, 2017). Though there is a strong and established evidence base for family and systemic interventions across child- and adult-focused mental health challenges (Carr, 2025a, 2025b; Cloud *et al.*, 2026b; Rodolico *et al.*, 2022; Vossler *et al.*, 2025), no published studies have documented the development of a DMHI within this context (Welsh *et al.*, 2024). However, emerging evidence for dyadic and couple-based DMHIs demonstrates promise for relationally focused approaches (Kernová *et al.*, 2025; Shaffer *et al.*, 2020).

Individual psychotherapy and systemic family therapies are informed by multiple theoretical frameworks, yet diverge in key ways, including their conceptualisation of the client, goal orientation, technique and approach. Designing systemic DMHIs for family use therefore requires a distinct approach. Emerging evidence reinforces this need: a recent systematic review of parent–child DMHIs highlighted the importance of relationally informed design (Chew *et al.*, 2026), while qualitative research points to the inherent complexities of supporting family wellbeing through digital platforms (Tariq *et al.*, 2025). Moreover, broader evidence suggests that digital media can undermine face-to-face interaction, exacerbate interpersonal conflict and weaken family relationships (Alwuqaysi, 2025). Taken together, these findings underscore the importance of explicitly accounting for systemic processes in DMHI design.

There is a robust literature base on the design characteristics of DMHIs for individuals (Stiles-Shields *et al.*, 2016), some of which are likely relevant to systemic applications. Possibly more useful is a systematic comparison of individual and systemic practice models to identify where further development is needed. The current paper aimed to do just this, adopting the perspective of a DMHI designer to examine theories of change, distinct techniques and other elements relevant to the design of a systemic DMHI. In doing so, we examine where existing knowledge can be transferred or adapted and identify areas for further research to inform the design of a systemic DMHI for family use.

The paradigm of individual psychotherapy

Psychotherapy is an interpersonal treatment intended to alleviate distress experienced by an individual related to a mental disorder, problem or complaint (Wampold, 2015). Grounded in psychological principles, there are a multitude of different models of psychotherapy. In general, they aim to encourage appropriate modifications of the client's perspective, thereby transforming the meanings of their experiences and resulting in alleviation of distress (Wampold, 2015). A brief precis of cognitive behavioural therapy (CBT) is reviewed below, as a point of reference for the subsequent review of systemic frameworks. CBT is chosen due to its prevalence and rapidly growing evidence for its effectiveness in digital format (Howes *et al.*, 2023; Lattie *et al.*, 2022; Plessen *et al.*, 2025).

Distinctive features of CBT

CBT is a dominant psychotherapy modality and has a broad evidence base across a diverse range of ages and diagnoses (Fordham *et al.*, 2021; Hofmann *et al.*, 2012; Lattie *et al.*, 2022). CBT is problem-focused with an emphasis on the present, setting goals to improve the client's current state of mind. It aims to alleviate distress by exploring the links between thoughts, emotions and behaviour, hypothesising that emotions and behaviours are influenced by the way one interprets and construes a situation and not by the situation itself (Beck, 1964; Fenn and Byrne, 2013).

As such, the development of more flexible, less negative meanings, dysfunctional attitudes and behaviours is thought to account for therapeutic change (Antichi and Giannini, 2023; Barkham, 2021; Salkovskis *et al.*, 2023). Therapists seek to help clients expand their thinking to become aware of underlying assumptions and help individuals discover alternative perspectives and solutions for themselves. Psychoeducation is a critical component of CBT, where therapists provide clients with information about their condition and teach techniques for managing and coping with stress (Khoury and Ammar, 2014). Furthermore, individuals are taught to identify unhelpful thoughts, replace them with more beneficial thoughts and to modify maladaptive behaviours (Lattie *et al.*, 2022). This process is thought to enable individuals to adapt their perspective on themselves and their problems, increase their ability to respond more flexibly and thus alleviate distress (Salkovskis *et al.*, 2023).

CBT sessions are typically held weekly for a few months, with recommendations varying for different conditions. For example, evidence has demonstrated that a higher treatment dose (attending more sessions) and greater patient engagement (adhering to homework and demonstrating commitment to CBT) results in greater long term symptom reduction for anxiety disorders (Glenn *et al.*, 2013), with studies identifying the optimal dose to achieve a clinically significant change is between eight and 14 sessions (Carr *et al.*, 2017; Levy *et al.*, 2020). For management of schizophrenia, however, guidelines advise that CBT should be delivered over a minimum of 16 planned sessions (Jones *et al.*, 2018; National Institute for Health and Care Excellence, 2014).

Client characteristics and the therapeutic alliance

Certain client characteristics are known to influence the outcomes of psychotherapy, regardless of which model is adopted. It is hypothesised that the client must believe in the treatment, be motivated to believe in the treatment or be led to believe in it, to see success (Barkham, 2021; Kazdin, 2009). Furthermore, their expectations and the perceived credibility of the treatment likely influence outcomes (Barkham, 2021). Other known influencing factors include demographic characteristics, symptom severity, diagnostic co-morbidity, existing insight and self-awareness, emotional expression or resistance and interpersonal behaviour (Barkham, 2021). Finally, the therapeutic alliance is likely the most prominent explanatory factor proposed for the efficacy of psychotherapy (Kazdin, 2009; McAleavey and Castonguay, 2015). The collaborative nature of the patient–therapist relationship, their agreement on goals and the personal bond that develops during treatment is an accurate predictor of outcomes in psychotherapy (Barkham, 2021; Kazdin, 2009; McAleavey and Castonguay, 2015; Wampold, 2015).

Points of departure from the individual lens: systemic psychotherapy frameworks

Focusing on systemic psychotherapy and family therapy frameworks, we highlight points of departure from the individual lens, which would be represented within the design of a multi-member DMHI. Systemic psychotherapies aim to improve mental health outcomes and support healthy family development by addressing the relationships between individuals, families and social networks (Carr, 2012). Systemic family therapy has a sound evidence base for an array of presenting issues and, for some conditions, has proven more effective than individual psychotherapy (Carr, 2025a, 2025b; Cloud *et al.*, 2026b; Rodolico *et al.*, 2022; Vossler *et al.*, 2025). Systemic practice can include working with individuals to accomplish systemic change but is often more successful when working with the wider care system (Heatherington *et al.*, 2015). As with psychotherapy, there are numerous models of systemic family therapy. Here, we focus on general principles evolving from the integration of the major schools of practice, namely structural, Milan, strategic, narrative and post-Milan

thinking (Goldenberg, 2017; Hayes, 1991) and explicitly highlight the key change mechanisms most likely to influence DMHI design.

The client is the family

Systemic psychotherapists contextualise an individual's symptoms as arising, existing and changing within the context of their family and social systems (Hunger *et al.*, 2016) and privilege the role that close and trusting relationships play in an individual's health and wellbeing (Dourdouma *et al.*, 2020). The focus of family therapy is on the entire family's relationships, communication patterns and behaviours, rather than just one individual's problems.

The family is a system

In systemic therapy, the family is seen as a system, defined by the following assumptions: no single person orchestrates interactional patterns; no single person can be blamed for family or relational distress; and all behaviour makes sense in the context of the system (Gehart, 2023). The focus is on engaging the family to understand the influence of family interactions on shaping or perpetuating problems and their potential for helping to resolve them (Nichols and Tafuri, 2013). Problem maintenance and persistence are more relevant than their origin, and how people speak and interact with one another is equally as, or more relevant than, individual internal processes, such as what they think and feel (Dourdouma *et al.*, 2020; Rohrbaugh, 2014).

Families have feedback loops

Systems seek to maintain balance or homeostasis through self-correction. Sometimes well-intentioned, persistent attempts to solve a problem inadvertently contribute to maintaining or exacerbating it. Systemic therapists seek to observe and interrupt these types of family interactional patterns, assuming that in so doing, family members can alter the trajectory of their problem (Rohrbaugh, 2014).

The therapist is part of the system

In systemic therapy, the therapists – or commonly co-therapists – are part of the system. Systemic practitioners operate with awareness of the ways in which their own socio-cultural background, gender, status and within-session behaviours impact the system (Lini and Bertrando, 2022). As with individual psychotherapy, the therapeutic alliance is a robust predictor of therapy outcomes (Friedlander *et al.*, 2018). This alliance extends to each member of the system, the group as a whole and between co-therapists. Between-system alliances (e.g. parent–therapist or child–therapist) and the shared sense of purpose (or lack thereof) between family members present the possibility for split or unbalanced alliances (Hardy *et al.*, 2020).

Targeting change within the system

Family therapists use several techniques to enable change within the system. They elicit all family members' points of view to introduce new information into the system and help redefine the idea that an individual is the problem (Hammond and Nichols, 2008), instead pointing family members towards the interactional patterns involved. Circular questioning is a cornerstone of systemic psychotherapy and involves asking individuals how other members of the system respond relationally to problems, assisting families to shift from linear to circular thinking while deliberately avoiding cause-and-effect explanations (Nichols and Tafuri, 2013; Rohrbaugh, 2014). These tools help to interrupt blaming, deepen the

family's understanding and reconceptualise the issues as shared challenges which are modifiable (Carr, 2016; Hardy *et al.*, 2020). Systemic enactments are another common tool whereby the therapist asks the family to enact a typical family exchange in session (Minuchin, 1974). In observing relational patterns, the therapist can provide opportunities to restructure these patterns to facilitate change (Heatherington *et al.*, 2015).

Client characteristics and engagement

Client characteristics influence systemic family therapy outcomes in complex ways. Family members' demographics, symptom severity and diagnostic co-morbidities multiply the impact on the likelihood of success (Karam *et al.*, 2015). Family members differ in motivation levels and readiness (Friedlander *et al.*, 2018). Additionally, it is not uncommon for family members to have contrasting feelings about participating in therapy, and, if not overcome, this disparity can result in poor family collaboration (Heatherington *et al.*, 2015).

Encouraging participation of family members who might be involved in the problem and the solution, and facilitating their active engagement in sessions, is an important aspect of the therapists' role (Hardy *et al.*, 2020; Heatherington *et al.*, 2015). Furthermore, what is said within family therapy is witnessed by other members and can have significant repercussions outside the therapy room (Hardy *et al.*, 2020). Therefore, there is a critical therapeutic skill necessary when deciding who can and should participate in family therapy, either within a particular session or over the course of an episode of care (Crago, 2005).

In systemic family therapy, evidence suggests that the intensity of therapy should be matched to client need (Carr, 2025a, 2025b), but that in general, therapy spans three to six months and involves between 6 and 20 sessions. These may include sessions with family subsystems or with members of the wider system, including other professionals (Carr, 2016). In family therapy generally, however, where safe and possible, power is de-centred, and the therapist aims to take a collaborative stance, led by the family in how sessions progress.

Application of the BIT framework to a systemic DMHI

There are clear differences in the underlying theories of change between individual and systemic psychotherapies, with important implications for DMHI design. To scaffold our synthesis, we apply the behavioural intervention technology (BIT) framework – a model integrating behavioural science, design and engineering to guide designers in translating a general clinical aim to a clearly defined technological application (Mohr *et al.*, 2014). We draw primarily on a systematic review of CBT-informed DMHIs (Stiles-Shields *et al.*, 2016) – selected for its use of the BIT framework in synthesising results – as well as contemporary literature, to examine how individual features may inform systemic design and to highlight opportunities for future research.

The BIT framework comprises two levels: the theoretical level, consisting of the *aims* and the behaviour change *strategies*, and the instantiation level, consisting of the *elements*, *characteristics* and the *workflow* (Mohr *et al.*, 2014). In summary, the aims and strategies are each brought to life by various elements, characteristics and the workflow. More specifically, the elements are the components of the DMHI with which the user interacts (e.g. website pages, interactive activities, self-assessment quizzes) displayed to the user in accordance with defined characteristics (e.g. via video format, using visuals or audio) and workflow (i.e. the order in which elements are expected to be completed). Figure 1 provides a diagrammatic depiction of the BIT Framework. It demonstrates the *theoretical* components which are instantiated by the *elements* on the computer screen viewed by the user. The elements exhibit different *characteristics* (as depicted by the varying colours and shapes), and the way they are

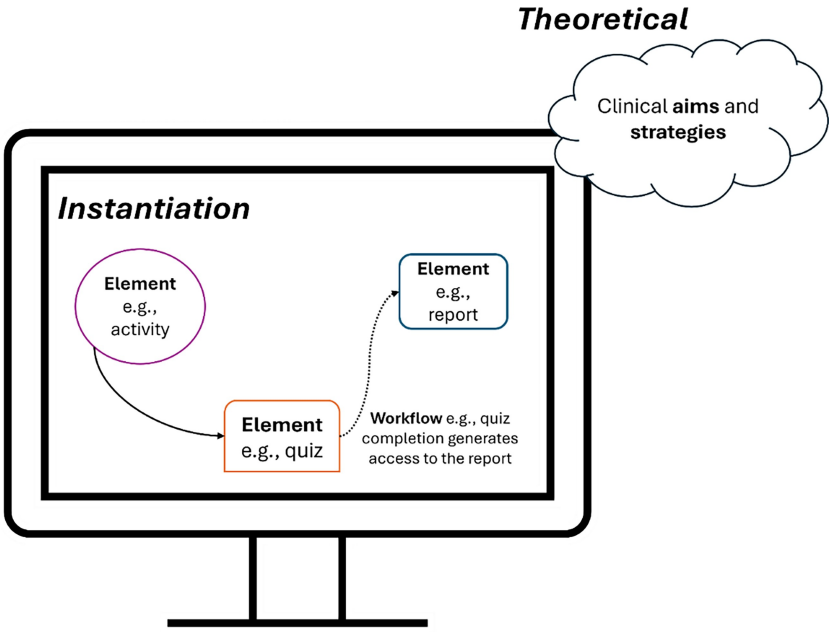

Figure 1. A diagrammatic depiction of the BIT framework (Mohr *et al*., 2014) demonstrating the components of theoretical and instantiation levels

Source: Authors' own work

connected and accessed by users is described by the *workflow* (depicted by the arrows between the elements).

The BIT framework: the theoretical level

A designer of a systemic DMHI would first define the *aims* and the theoretical *strategies* for achieving those aims (Mohr *et al*, 2014). For example, all DMHIs identified by Stiles-Shields *et al.* (2016) aimed to reduce the individual's symptoms; however, strategies varied, with psychoeducation most commonly used as the primary mechanism of change, alongside self-assessments, case vignettes and homework to reinforce learning. More recently, a review of youth-oriented DMHIs highlighted goal setting as another common change strategy to facilitate symptom reduction (Opie *et al.*, 2024).

We propose that systemic theories of change are readily translatable to an aim and associated strategies. A systemic DMHI might aim to improve relational and family health. Strategies to achieve this aim could include systemic reframing of the challenges, highlighting other family members' perspectives and family-led decision-making. Furthermore, psychoeducation, case vignettes and homework assignments could likely be adapted to a systemic context.

The BIT framework: the instantiation level

Instantiating a relational aim and associated strategies likely poses some complexity. For an individual DMHI, the *elements*, *characteristics* and *workflow* typically resemble those of face-to-face delivery. Common DMHI elements identified by Stiles-Shields *et al.* (2016)

included text-based lesson content, with some incorporating messaging portals, notifications, media libraries or fantasy-like game elements. Reminder prompts to modify behaviours, identify and challenge unhelpful thoughts or schedule and track positive behaviours are other common DMHI elements (Lattie *et al.*, 2022). Characteristics of intervention elements are less commonly reported or often vague, for example, describing "eye-catching graphics and sounds," while the workflow typically resembles linear manualised treatments, with defined periodic engagement or structured release of content (Barkham, 2021; Stiles-Shields *et al.*, 2016).

Design of a systemic DMHI for family use would be predicated on creative embedding of systemic techniques into the *elements*. In person, systemic therapists observe relationship dynamics, participate in and reflect on conversations and use techniques to elicit different points of view (Nichols and Tafuri, 2013; Rohrbaugh, 2014). In a digital format, static text-based lesson content may serve a purpose, but alone is likely insufficient to reflect the active role of the therapist and to facilitate relational connection between family members. Possible digital solutions could include embedding systemic tools such as enactment-style activities (Minuchin, 1974), where prompts and questions could support individuals and families to reflect upon typical family exchanges and identify their own relational patterns. Similarly, circular questions (Nichols and Tafuri, 2013; Rohrbaugh, 2014) could be used throughout to complement static content and support families to expand their focus from an individual to the system. DMHI elements such as tracking positive behaviours may not be useful in a systemic context; however, they could inform the development of tools to support families to track their relational health over time.

The *characteristics* describe the ways in which the elements would be optimised to improve the user's comprehension and ability to complete and engage with the elements (Mohr *et al.*, 2014). In a systemic context, there is an integral requirement to engage multiple family members across ages and generations, both together and separately. Engagement science is complex and contributing factors remain unclear for individuals (Perski *et al.*, 2017; Torous *et al.*, 2018). One consistent finding is that age-specific DMHIs are more likely to promote engagement (Lattie *et al.*, 2022), likely due in part to digital divides across generations, which influence motivation and attitudes towards engaging with digital media (Tariq *et al.*, 2025). Families comprise individuals across varying life stages; as such, systemic DMHIs may provide content in multiple versions to accommodate varying needs and preferences across the life course. For example, content developed for younger users may use animations and minimal text (Opie *et al.*, 2024). In addition, artificial intelligence proves a promising opportunity for customising DMHI elements for the needs of individual family members (Mikaeili *et al.*, 2025). Finally, the characteristics of *shared* elements – for example, a tool to support families to map their own relational patterns, together – would require careful design to optimise whole-of-family engagement.

As highlighted earlier, DMHI *workflows* commonly involve linear, periodic engagement, with an expectation that individuals will return over time (Barkham, 2021; Stiles-Shields *et al.*, 2016). Common approaches for individuals, for example sending reminders to return, have returned mixed results on their efficacy (Gan *et al.*, 2022). In any context – and particularly within a systemic one, where known engagement challenges (Torous *et al.*, 2018) are likely to be exacerbated – designing the workflow of a DMHI presents an opportunity to reconsider expectations around sustained engagement. There is a growing evidence base supporting single-session approaches to family and systemic psychotherapies (Cloud *et al.*, 2026a; Hartley *et al.*, 2023; Moore *et al.*, 2025), where each session is treated as complete in and of itself, while the choice to return for further sessions is left up to the

family. In this novel context, optimising each encounter with the DMHI may prove an appropriate avenue for further investigation (Grajdan *et al.*, 2025).

What is not accounted for in the BIT Framework but is uniquely relevant in a systemic context is the "who." That is, who should engage in each element and who should engage together? Current reporting of approaches to doing so are limited (Grajdan, *et al.*, 2025; Welsh *et al.*, 2024), however, a recent review highlighted the likely benefits of doing so, indicating shared use may foster regular practice, communication and mutual motivation, promoting engagement and increasing the chances that the DMHI learnings will be integrated into daily routines (Chew *et al.*, 2026). Like in person, it can be assumed that to facilitate systemic changes in relational health, it would be advantageous to enable shared engagement (Heatherington *et al.*, 2015). Design questions remain, however, including approaches to ensuring safety in the absence of a therapist, and the ways in which elements can be characterised to enable meaningful collaboration.

Discussion

Design of DMHIs is closely linked to user engagement and effectiveness (Stiles-Shields *et al.*, 2016; Zainal *et al.*, 2026), yet existing guidance largely focuses on individual users, with limited direction for family or systemic applications (Welsh *et al.*, 2024). This synthesis advances this field of research by identifying key features of systemic psychotherapies that distinguish DMHIs for individual versus family use. Using the BIT Framework, we provide a transparent, evidence-informed account of core considerations needed to translate systemic clinical aims into specific design elements. With growing calls for increased access to, and evidence supporting family-inclusive mental health care (Jensen and Mendenhall, 2018; Harvey and O'Hanlon, 2013; Poon *et al.*, 2019; Saroca and Sargent, 2022), this paper offers a timely synthesis to guide the development of systemic DMHIs.

This synthesis highlighted the *characteristics* (that is, the way intervention elements are presented to users) as the most prominent area for research and development, influenced by shared engagement priorities and the strategies employed to achieve the aims. In this novel field of DMHI design, co-design with families is critical to progressing towards implementation to ensure relevance, usability and accessibility (Chew *et al.*, 2026; Welsh *et al.*, 2024). This paper offers designers and researchers some direction in taking those next steps.

Conclusion

There are unique and complex challenges associated with designing a systemic DMHI for family use. By identifying the distinguishing features of in-person systemic psychotherapies, the findings in this paper can usefully inform designers of DMHIs seeking to use a systemic perspective in platform builds. The context-specific factors highlighted here should provide guidance for designers to direct their fields of enquiry, offering an opportunity for meaningful DMHI design.

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