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Review Article

Supporting Service Recipients to Navigate Complex Service Systems: An Interdisciplinary Scoping Review

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This scoping review aimed to identify potential factors from across eight disciplines' approaches to complexity that could be positively applied to supporting services users to navigate health and social care. The illustrative example of families where a parent has mental health challenges is used as those families often have a wide range of complex needs both for the parent/s and children. These complexities can result in the involvement of multiple services and interventions. However, in attempting to respond to complex family needs, health and social care services may unintentionally increase the complexity and associated stress for the family. Two broad themes were identified within the multidisciplinary literature including testing service developments with a view to reduce or manage complexity and approaches to support service users to navigate complexity. Specific learning from the scoping review can be applied to health and social care services to encourage a focus on service users' expectations, understandings, and experiences of services; carefully consider the relationship between the service design and the service user's behaviour; and finally reinforce the importance of service user involvement (or coproduction) within service development and consideration of the relationship between the service user and provider. The knowledge drawn from this scoping review can inform the development and evaluation of current services and guide the development of future services. It can also help consider approaches to empower service users to navigate the complexity of services.

1. Introduction

Health and social care services often need to respond to clients' complex needs, but at times, may unintentionally be complex themselves, resulting in stress and challenges for service users. This is clearly demonstrated with families with experience of parental mental health challenges, also referred to as Families where a Parent has a Mental Illness (FaPMI), who, in addition to managing the needs directly associated with their mental health, may also be trying to meet a complex range of other needs, including, for example, employment, housing, and education. Services, often with the positive intention of increased specialism and effectiveness, can be relatively fragmented [1]. Health and social care professionals, especially in circumstances where their own time is very limited, will often refer families to as many

sources of possible support as possible. One of the reasons families may be in contact with services is that they are feeling overwhelmed. The service response, in attempting to positively address this, may unintentionally increase complexity and associated stress.

The rationale for this scoping review of the literature was informed by a case file audit of families in contact with mental health and child welfare services in Northern Ireland, which found that many families were involved with a large number of services [2]. It was reported that the average number of referrals per case file was 13.7 (range 6–26 referrals); and the average number of services per case file was 12.25 (range 6–23), with referrals ranging from child and family support, speech and language therapy, to debt counselling. This appears to be a bewildering number of referrals and services and may also not include referrals made from other sources such as to education providers and other organisations. This concern is not specific to Northern Ireland. In the US, for example, Goerge and Wiegand [3] found that, from a sample of 502,165 families, 23% were accessing multiple services, and these families accounted for 86% of the funding for health, mental health, juvenile, criminal justice, and child welfare needs. Likewise, in Australia, the Productivity Commission [4] and the Victorian Mental Health Royal Commission [5] highlighted the need to provide support to navigate services. Spratt [6] provides further clarification by pointing out that families experiencing multiple adversities across the life course often receive multiple services horizontally, across service domains, and vertically, across generations, and identified the need to provide support to navigate such services.

It is important to note that there are various definitions of complexity [7]. Sheill et al. [8] highlight two main aspects of how complexity is used in relation to health and social care. The first refers to complicated interventions and services which have many components that may work separately and/or together and the associated complexity is often presented as a challenge to be overcome. The second, informed by complexity science, adds a more systemic understanding and highlights the ability of complex systems to adapt, interact, and innovate, in nonlinear, intricate, and creative ways, with other systems and their environment.

Approaches to addressing complexity and fragmentation can focus on services and/or families by simplifying the available options, improving effectiveness and/or developing ways to more effectively manage or navigate complexity. There is also the increasing awareness of the importance of involving families in all aspects of the development and implementation of the whole range of possible approaches [9]. With a focus on services, approaches can reduce complexity and/or fragmentation through restructuring or rationalising services, such as wraparound or assertive outreach teams, which attempt to support families' needs directly rather than referring to multiple other services. Another services-focused approach aims to help professionals better manage or navigate services such as the Eastern Navigation Resource [10] in Victoria or the Think Family Champions initiative in Northern Ireland [11].

In a similar way, if the focus is on families, approaches can attempt to directly address the complex needs of families and/or support families to better manage or navigate the

complexity of services. Approaches to reduce the need for complex services involve the whole range of effective interventions to assess and address parental mental health challenges, the associated children's needs, and whatever other needs the family may have [12, 13]. Within approaches to meet families' complex needs, there are specific interventions to support them to manage the complexity of their needs such as genograms, eco-maps and family journey maps [14], and more general, strengths-based approaches [15]. Unger [16] suggested that family therapists can help clients navigate by making interventions available and culturally relevant and making interventions accessible and integrated and also by working with families to advocate for resources.

Reducing the complexity of services and/or more effectively meeting families' needs have been the focus of most service and intervention developments and research, but a final category of possible responses to the complexity of services involves equipping families for their role to navigate or manage the services they are using. Traditionally, examples of this final category tend to involve approaches such as providing families with more information about services and encouraging the use of strategies to organise such as a diary to manage appointments. Emerging Minds in Australia provide an excellent set of online videos which provide accessible information for families about the relevant issues and the roles of different professionals and services (emergingminds.com.au/families). Another approach is to develop peer support and advocacy to engage with services. Unger [16] highlighted the potential role of therapists in supporting people to self-advocate for their own services and collectively for resources for all. Beginning in the late 1980s in cancer services, there have also been specific patient navigation programmes (PNPs) developed which can be defined as "a program whereby a patient navigator provides patients and/or their family with support in accessing healthcare resources" (14, p. 1). In their scoping review of 60 articles on PNPs for adults with complex needs, Kokorelias et al. [17] identified that the focus in most PNPs is on the role of the patient navigator to promote integrated care and communication, but a few studies did also highlight that the role could include promoting patient and family empowerment.

The amount of support or preparation for families to navigate services tends to be in stark contrast with the level of preparation for professionals who will usually have had a number of years of training, including practice placements, some form of induction into their current role and organisational context, and ongoing professional development training.

The aim of this scoping review is therefore to identify approaches (models, strategies, tools, and interventions), from across a range of disciplines, that have been developed to navigate complexity and so explore if there may be possible alternative approaches to more effectively supporting families to navigate health and social care services themselves. There continues to be the need to consider how services can be more accessible, integrated, and effective and to support families to manage their complex needs, but the

focus in this scoping review is specifically on how families might be enabled to engage with and manage the range of services they may have contact with. It is important to acknowledge that exploring the literature from a range of disciplines to inform how health and social care service users can be supported is a relatively unusual approach. The research team was made up of health and social care researchers and so our understanding and interpretation of perspectives from other disciplines may have been limited. Conversely, a key aspect of the rationale for this approach was to explore perspectives which are not usually considered in health and social care research.

The scoping review addresses two main questions:

(1) What types of approaches and interventions, from across disciplines, have been developed to manage complexity?

(2) Are there possible service developments, informed by this scoping review, which could be explored to more effectively support service users to navigate health and social care services?

The scoping review also provided important information from a range of disciplines about understanding complexity, which provides the context for the review.

1.1. Understanding Complexity. There are a number of explanations, from across disciplines and service areas, about why complexity is an important consideration. An early example is from Andaleeb and Basu [18] who, in relation to car servicing and repair, highlighted that increased complexity can be associated with increased service user feelings of vulnerability and concerns about fairness related to imbalances of knowledge and power. Benazic and Varga [19] explored service user satisfaction about consultancy services and also highlighted the potential negative impact on satisfaction when dealing with high levels of technical complexity. Bogicevic's [20] research was about the "elaborate servicescape" of airports, which identified that clear signs and information in a clean and pleasant environment were associated with service user satisfaction. Gong and Choi [21] reported that although task complexity can be stressful, in the right circumstances, it can also stimulate service users' and service providers' collaboration, creativity, and innovation.

Service users' expectations and previous experiences of services have also been identified as important by Finsterwalder and Tuzovic [22]. Boulding et al. [23] used simulated hotel and restaurant settings and found that people's prior beliefs and experiences were influential in how they experienced a service. Related to expectations, research from across types of service suggests that a consistent, reliable service is important to service user satisfaction [18, 19, 24].

A recurring theme in the literature exploring complexity is the importance of involving service users, especially in the design stages, and developing the relationships between service users and providers. In relation to shipbuilding, Dixit et al. [25] emphasized the importance of involvement especially in the early stages of a project. Witherspoon [26] focused on communication including the need to select the most appropriate mode/s of communication for associated purpose and issues. The importance of promoting empathy in relationships with service users has also been highlighted. For example, Bennett and Rosner [27] examined the use of a variety of strategies to further develop empathy, in that case with disabled people, and Cardador and Pratt [28], looking at credit unions, emphasized the importance of identification between service providers and users. The focus is often on the relationships between service users and providers, but, in their work on tourism, Carlson et al. [29] also noted the importance of relationships between service users.

Overlapping with the theme of relationships, Goodwill et al. [30], in their work on design in the public sector, encourage the consideration of power issues including privilege, access, goal power, role power, and rule power. Gupta et al. [31], Gao et al. [32], and Huang et al. [33] all highlight the need to consider service users' feelings of competence, autonomy, and control.

This broad theme, from across disciplines, of the need to explore and understand complexity, especially from the service user's perspective, provides the context for this scoping review.

2. Methods

In their typology of literature reviews, Grant and Booth [34] describe scoping reviews as an assessment of the size and scope of the available research, which aims to provide an overview of the quantity and quality of the literature, but may not involve the more focused, in-depth searches or formal assessments of quality of traditional systematic reviews. Arksey and O'Malley [35] also clarified that scoping reviews tend to explore relatively broad and/or complex topics and may include a wide range of types of sources. They suggested a five stage approach to scoping review which involves identifying the research question; identifying relevant studies; study selection; charting the data; and collating, summarising, and reporting the results. Peters et al. [36] suggested that "scoping reviews may be conducted to determine the value and probable scope of a full-systematic review, they may also be undertaken as exercises in and of themselves to summarize and disseminate research findings, to identify research gaps, and to make recommendations for future research." (p. 141). However, they do still recommend a systematic approach to a scoping review although acknowledge that there may be a more iterative approach to the review protocol. Tricco et al. [37] have helpfully developed the PRISMA-ScR (Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews) and so that format will be used to present the process of this review. As this was a scoping review of the literature, ethical approval was not required and the review did not involve external funding or any conflicts of interest.

Initial discussions with the research team identified the central concept of "complexity" and posed the question whether other disciplines could offer learning about how

they approach and manage complexity and whether they could be applied within the context of health and social care.

2.1. Identifying Relevant Studies. After consultation with a librarian, a brief scope of the complexity science and consumer services literature was used to identify potential concepts from eight different academic disciplines (architecture, business/management/marketing/retail, construction, design/planning, engineering, health and social care, mathematics/computing, and public administration). From initial exploration of the wider literature, these disciplines were selected as they were found to include research on understanding and addressing complexity and were relatively accessible to the research team without in-depth subject specific knowledge. A very focused key term search strategy was developed using combinations of the words "consumers," "consumer behaviour," "customers," "complexity," "service quality," and "wayfinding." As search terms were narrowly focused on specifically identifying approaches to supporting service users to manage complexity, no date limits were applied. Literature published in English was collected from five databases: Avery Index to Architectural Periodicals; Business Source Premier; Construction Information Service; Econlit; and Medline.

2.2. Study Selection. Articles were eligible for inclusion if they described approaches designed to simplify or improve accessibility or consumer interfaces. The setting could relate to any discipline but had to address a complex consumer interface. Articles that described theoretical approaches without practical examples were excluded. Titles and abstracts were independently reviewed by two authors (GD and CMcC). The full text of articles that met the inclusion criteria were retrieved and these were independently assessed by two authors (GD and CMcC). If disagreements arose, a third author was consulted. Articles were selected for inclusion if it was possible to identify some possible relevance to the issue of supporting families, where a parent has mental health problems, to navigate health and social care services. This was determined by two reviewers and, if necessary, by further team discussion.

2.3. Data Extraction. Included articles were categorised into different disciplines: accountancy; architecture; business (consumers, e-commerce, manufacturing, and operations); computing; design; health and social care; engineering; food and nutrition; information services; management; marketing; mathematics; tourism; and urban science.

Articles were distributed between the research team for data extraction. Every team member received a representative selection from a number of different academic disciplines. Data were extracted using a standard template in Microsoft Excel using the following questions:

(1) What is the complexity that this approach is addressing?

(2) What does it involve?

(3) Is the theoretical basis described?

(4) Is there any evidence of effectiveness?

(5) Is there potential relevance for families where a parent has mental health challenges?

2.4. Collating, Summarising, and Reporting Results. Information collected on the spreadsheet was used to identify key themes in the included papers. This was done through a process of thematic synthesis, as outlined by Thomas and Harden [38], which involves coding the data, identifying descriptive themes, and then developing analytical themes.

3. Results

3.1. Search Results. A total of 127 articles were retrieved in the initial searches, 80 were excluded at title and abstract screening, and a further 4 articles were excluded at full text. Forty-three peer-reviewed journal articles were selected for inclusion in this review as summarised in Figure 1.

3.2. Description of Included Studies. Research methods included case studies, experimental scenarios, content analysis, quantitative surveys, development of a tool, mixed methods, theoretical papers, and a scoping review. Authors of the included studies were from Australia; Europe (Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Italy, the Netherlands, Spain, UK, and Sweden); Turkey; Argentina; Brazil; Canada; China; Ecuador; India; Malaysia; Nigeria; Palestine; Singapore; South Korea; USA; and Taiwan.

Academic disciplines included architecture; business consumers, e-commerce, management, and manufacturing; design; engineering; food and nutrition; health and social care; IT; marketing; mathematics; public sector; tourism; transport; and urban design. Topic areas ranged from children with complex needs, shipbuilding, and credit unions to public transport. The oldest study was published in 1994 and most recent in 2022.

A summary of the included studies is presented in Table 1 with a more detailed data extraction table available in the supplementary materials (available here).

3.3. Analysis of Included Studies. The scope of the searches across disciplines was deliberately broad to explore a wide range of perspectives and approaches to managing complexity. The subsequent data extraction and analysis process focused on potential relevance to supporting families, where a parent has mental health problems, to manage complexity. The included articles were analysed to address the two research question areas: the testing of interventions to address complexity and possible specific service developments to support families navigate health and social care. The main theme for each article was identified: 19 focused on better understanding complexity from a range of perspectives and contributed to the context for this scoping review; 19
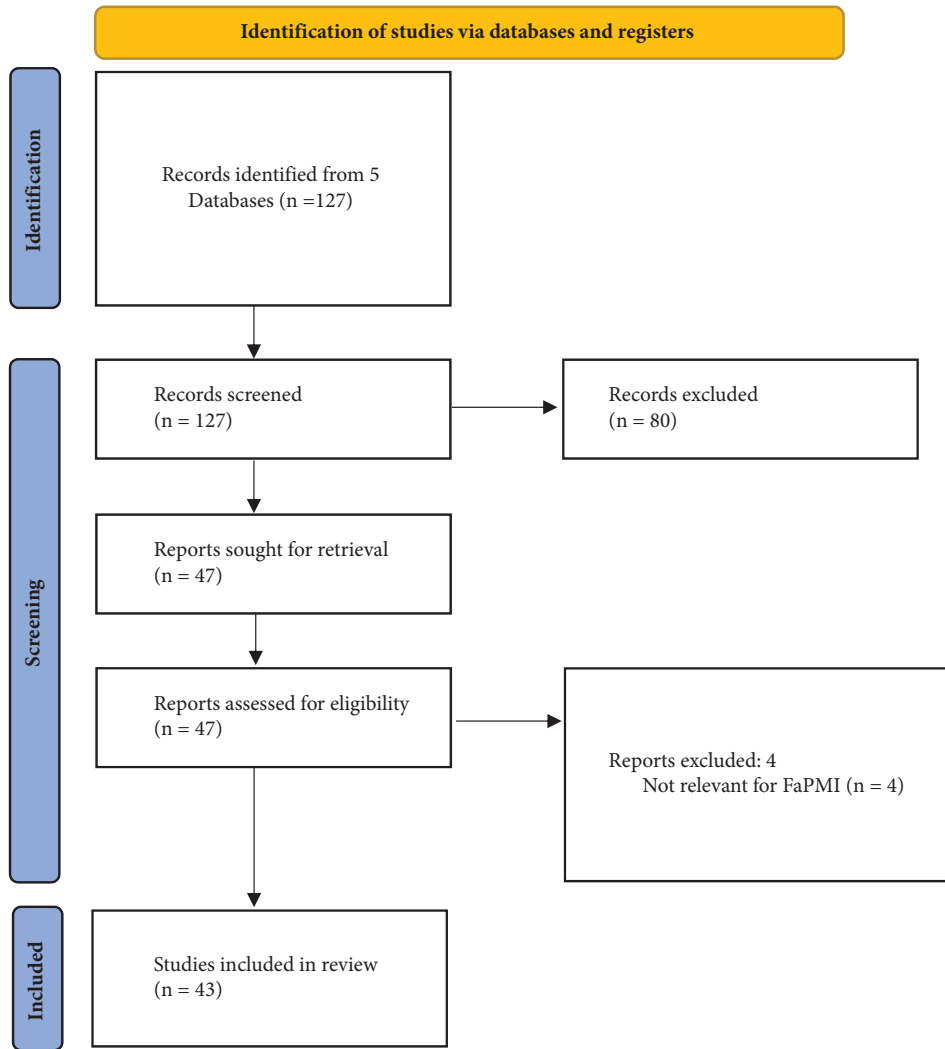
FIGURE 1: PRISMA.

included presenting data on the evaluation of some form of intervention to address complexity; and five presented examples of specific service developments directly relevant to supporting families navigate health and social care. There are, however, overlaps between these broad areas and some of the included articles provided information for all three. Information on better understanding complexity was used to inform Section 1.1 to provide the context for the scoping review.

The included articles also applied a range of theoretical perspectives to help understand service users' experiences and/or presented data exploring associations between a range of factors and service users' experiences. These include: Donabedian's inputs, processes, and outcomes approach [19]; customer journey design [58]; interpretive structural modelling [59]; focus groups, ratings, and surveys [18]; and the better use of routinely collected data [73]. These are not explored in depth but we considered it important to highlight the range of perspectives being used. The focus in

the findings is therefore on evidence of the effectiveness of interventions to address complexity and then specifically on interventions developed to support families navigate health and social care.

The articles come from a wide range of disciplines and there are a variety of terms used for people using and providing services. The use of language is important but for consistency and hopefully clarity; we have used service user for everyone using a service (inclusive of clients, consumers, and customers) and service providers for everyone providing any form of product and/or service.

All generally reinforced the need for a systemic approach to exploring and understanding service users' experience and satisfaction.

3.4. Testing Interventions to Address Complexity. These articles presented data on specific service developments aimed at promoting service effectiveness and service user satisfaction in the context of complexity.

TABLE 1: Data extraction summary.

1st author, year of publication, country	Discipline	Context/setting	Complexity/problem/s that this approach is addressing	Approach	Theoretical basis for the approach	Evidence of effectiveness	Potential relevance for families where a parent has a mental illness?
Andaleeb, 1994 [18], USA	Business (consumers)	Automobile service and repair	Addressing complexity in service and repair	Data collected subsequent to service encounter	Customer satisfaction depends on perceptions of services received. Is perceived fairness important in the evaluation of service quality?	Factors identified as important included empathy, responsiveness, reliability, convenience. Perceived fairness also related to customer satisfaction? Moderators include subjective knowledge and technical complexity	Useful methods: scale development; focus groups; participant ratings; mailed surveys. A focus on technical complexity may be useful in thinking about evaluation of complex interventions
Benazic, 2018 [19], Croatia	Business (consumers)	Business consultant services	Consumer expectation used for performance measurement of business consulting services	Performance analysis to identify and categorise dimensions in service quality attributes that lead to influence and user satisfaction	Perceived service quality is understood using Donabedian's service quality model through the dimensions of potential, process, and outcome	Paper looks at how business consultancies measure user satisfaction and therefore perceived risk in using the consultancy. When customer is not knowledgeable, perception of fairness increases with technical complexity	Considers the expectations users have of services and whether that impacts on how they engage with them
Bennett, 2019 [27], USA	Design	Theoretical paper	Aligning human computer interactions (HCI) with the values and needs of users, in this case disabled people	Empathy building activities, including computer programmes and physical tools to temporarily simulate disability	A critique of the current tools that are used by nondisabled designers to develop empathy for the experience of a disabled user	This is discussion paper so no clear indication of effectiveness; however, they are clear in their assertion that some empathy tools can be problematic and that the inclusion of the voices of disabled people is key	Empathy building—aligning designers with the values and needs of the people they are designing for to support the customer relationship, cultivate success, and make the design more inclusive. The importance of true participation and not just simulated empathy exercises
Blasco-Arcas, 2014 [39], Spain	Business (consumers)	University students (undergraduate and postgraduate) studying marketing, engineering, and management	Improving customer service involvement in online purchasing environments	Experimental design to test impact of personalization and interactivity on customer participation, involvement, and intentions to continue participating	How personalization and interactivity influence both customers' participation and involvement	Interactivity and personalization can help foster customer participation, involvement, and intentions to continue participating. Interactivity moderates the effect of personalization, increasing its influence on service involvement and intentions to participate	Interactivity and personalization can be beneficial for relationships with service users and how to engage them in developing and delivering services. It highlights the importance of developing fora and communication channels for services users to share their perspectives

TABLE 1: Continued.

1st author, year of publication, country	Discipline	Context/setting	Complexity/problem/s that this approach is addressing	Approach	Theoretical basis for the approach	Evidence of effectiveness	Potential relevance for families where a parent has a mental illness?
Bogicevic, 2013 [20], USA	Tourism	Airports	Passenger satisfaction	Content analysis of travellers' comments about their experiences of airports	Herzborg's motivation-hygiene theory (satisfaction and dissatisfaction are not on the same continuum but on different continua, with their own set of factors)	Key satisfiers included cleanliness and a pleasant environment. Key dissatisfiers included security checks, confusing signage, and poor dining options	Yes, important to consider key satisfiers and dissatisfiers in terms of the experience of using services
Bosetti, 2022 [40], Global	Computing	Website navigation	Supporting users to formulate queries and generate required answers with embedded search mechanisms	A tool to convert any web search service into an integrated search service that allows users to customize searches	Not clear	Yes, but small. The sample size was also small, total of 10 people participated in this evaluation	Useful for information access and the presentation of information
Boulding, 1999 [23], USA	Marketing	Simulated hotel and restaurant setting for business consumers	Consumer perceptions of quality in a service encounter and how it affects consumers' overall assessment of the quality of the firm	The model evaluated 8 hypothetical hotel and restaurant settings for a business trip. Participants reported expectations; delivered service; perceived quality	Consumer behaviour model "confirmatory bias" and "brand equity." The theory is that consumers have some objective views formed by their encounter of the service blended with their overall prior belief of the quality of the firm. The authors have developed a Bayesian equation to present their model	Prior beliefs about an organisation are "double counted" (1) People integrate information (not contrast it) so firms should focus on customers' expectations. (2) Customers assess overall quality relative to other competitive standards. (3) When complex "double whammy" effect is even greater, therefore information needs to be accessible. (4) Very positive service encounters can increase expectations—focus should be on reliable and equal service	Consumer behaviour is relevant to health services provision and services should consider customer satisfaction. People's prior beliefs about an organisation are important and that any new experiences of services will be integrated with these prior beliefs

TABLE 1: Continued.

1st author, year of publication, country	Discipline	Context/setting	Complexity/problem/s that this approach is addressing	Approach	Theoretical basis for the approach	Evidence of effectiveness	Potential relevance for families where a parent has a mental illness?
Brooks, 2013 [41], UK (England)	Health and social care	Hospital and community services for children with complex needs	Improving service quality for young people and children with complex needs through more effectively implementing multiagency working	Improved communication between organisations and with parents and young people included in decision-making. Identifying a professional to help families understand roles and navigate across organisations	The discussion highlights the need for "a model that empowers parents and patients with knowledge of how to navigate the healthcare system" (p. 59) and an enabling service model is proposed informed by general systems theory [42]	No but there is reference to national and international evidence for family-centred services	Yes, although the main conclusions are about service delivery. "Two implications for policy and practice emerge from this research. The first is for services to be coordinated in a way that assists parents and young people in understanding the services available to them and for a key worker to be allocated to each family—a family-centred approach to the provision of services...The second implication is the availability of more support for the caregiver." (p. 61)
Cardador, 2018 [28], USA	Management	Credit union	Improving employee-customer identification to promote employee meaningfulness and customer experience	Data was collected using semistructured interviews with $n=41$ employees of the police officers credit union and with five customers and 12 employees from the postal worker credit union, grounded theory was used to analyse data	Highlighted the importance of "bridging practices" that helped employees understand, appreciate, and be involved with their customers, valuing practice (the importance of employees demonstrating passion for serving customers). Employees, identified strongly with their customer group, experienced a form of "oneness" with those they served by becoming more like their customers	For employees, collective and role level occupational expressions of self-expansion contributed to a heightened sense of work meaningfulness. The basis for identification was employees coming to see themselves as like their customers. Findings suggest that employee-customers identification is not fully anchored in the organisation	Interesting findings about work-related identification and employee-customer identification to help effectively engage and understand service users' situations, perspectives, and needs. If health care organisations can provide avenues for bonding between service providers and service users, they may create greater benefit for organisations, service providers, and service users
Carlson, 2016 [29], Australia	Marketing	Online survey of 389 respondents with group travel experience to major events	The study aims to explore how consumers engage in group-travel behaviour	Reported that individual and communal experience are equally important in generating customer benefits	Activity theory-" suggests that most forms of human activity, including customer-to-customer interactions, are driven by social motives and that both individuals and communities make links simultaneously within specific contexts"	Yes	The importance of creating a sense of community and opportunities for peer-to-peer support

TABLE 1: Continued.

1st author, year of publication, country	Discipline	Context/setting	Complexity/problem/s that this approach is addressing	Approach	Theoretical basis for the approach	Evidence of effectiveness	Potential relevance for families where a parent has a mental illness?
Clarke, 2012 [43], China	Information services	The use of second life, where people can interact through avatars, to create virtual library services	The study aims to explore how new users experience the virtual world, especially virtual library services	Virtual library services include interactive reference desks, video, podcasts and chat bots. An important aspect was also providing information about how to use second life itself	There is some discussion about previous research on the use of virtual worlds	The findings were mainly about the positives and negatives for new users	The study identified the importance of interacting as avatars, the opportunity to meet people was highlighted, the design of the virtual environment, and the design of the librarians' avatars. It also identified some barriers including the costs, the complexity of the system/technology, the time needed to get familiar with the virtual world, and, for some, reluctance to interact as avatars
Coley, 2008 [44], UK (England)	Engineering	Design approaches to sustainable services. Automobile industry	Need for the integration of multiple stakeholders with an array of knowledge and expertise; high levels of multidisciplinary work increase levels of complexity	Is there value in developing a generic model of best practice for the design of systemic, sustainable solutions?	The focus is on multidisciplinary product-service systems (PSS) to design products and services to fulfil client demands. Suggestions include focus on actor identification; PSS scenarios (use cases, sequences of actions); representation, and management tools to represent PSS in all its components. Requires solution focused partnerships and integration	More research needed	Relevant to the extent that sustainable solutions are best developed with input from multidisciplinary stakeholders and multiple perspectives
Coskun, 2019 [45], Turkey/USA	Business (consumers)	Store environments, participants were shown visuals of different stores	The need for "brick and mortar" retailers to consider environmental stimuli to entice consumers and compete with online retailers	This article described two studies which explore responses to different store environments	"Garaus et al. [46] recently developed conceptual framework "retail shopper confusion" with three emotional subsystems of a human mind." (p. 324). The main hypothesis is that information overload, which includes human crowding and store messiness, contributes to retail shopper confusion and so negative shopping behaviour	Yes, the findings of two studies are presented which both confirmed that human crowding and store messiness lead to retail shopper confusion which contributes to negative consumers' reactions	Yes, the findings suggest that well-designed, uncrowded, ordered, and harmonious environments may help minimise confusion and promote positive responses
Dahleez, 2021 [47], Palestine/Israel	Health and social care	Health centres	Problems with conflicting objectives, data issues, different information systems (IS), and resource planning systems	Tested an integrated information system to investigate the impact on care, relationships, and user satisfaction	Integrated various IS systems, i.e., the technology acceptance model (TAM), the D&M model, and the IS user utilization/satisfaction in health care	The study found a positive impact on staff performance, patient care, and the doctor-patient relationship. Limitation was not asking patients themselves	There could be though the actual IS and what it entailed is not clear

TABLE 1: Continued.

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de Looper, 2022 [48], Netherlands	Health and social care	Hospital	Aimed to develop, implement, and evaluate an online health information tool for older cancer patients to complement consultation with healthcare providers	RCT of "the patient navigator" which included animations and videos showing treatments, patient experiences, and professional explanations. Options to tailor the information and record consultation sessions	MRC framework for intervention development	Usage patterns point out that patients used the patient navigator more to prepare for the consultation instead of checking for information after the consultation. The tool did not perform better than comparable others and did not reduce patient anxiety but did help with preparations for consultation	Some features of the online tool are useful in this context
Dixit, 2019 [25], India	Business (operations)	Shipyards	The impact of involving consumers on sourcing, project execution, shipbuilding project performance	Interviewing shipyard managers/senior staff about shipbuilding projects	A theoretical framework depicting the role of customer involvement on project performance was developed—the term "fuzzy" is used in relation to the language used by customers—rough set theory—contributes to this by looking at what is being built (the end product)	Customer involvement in sourcing decisions during the early stages of the project has a positive impact, whereas involvement in project execution during the later stages of the project has a negative impact on project performance. Project complexity and customer type together significantly affect the performance	Role of customer involvement especially in complex projects
Finsterwalder, 2010 [22], Australia/NZ	Business (consumers)	Theoretical paper	Complexity due to different expectations, skill level, past experience of the service, willingness to contribute, other consumer behaviour and interactions	Cocreation and consumption of a service quality model	Conceptual paper	N/A	The importance of the coproduction of services
Gao, 2018 [32], China	Marketing	Online shopping	How the presence generated by online shopping website affects consumer psychology and behaviour	Telepresence promoted via enhanced approaches to display the products. Social presence via use of instant messaging, social media, and live streaming	Self-determination theory (SDT) perceived telepresence and social presence should fulfil consumers' psychological needs, including autonomy and relatedness, which in turn will shape consumers' attitude and purchase intention	Yes—telepresence is positively associated with consumer autonomy and stickiness (consumers' willingness prolong their visit and revisit), while social presence is positively associated with consumers' relatedness and stickiness	Highlighting the relational role in self-directed navigating as well as the need to understand and see how it relates (in this case, the product)—perhaps the possibility of using these advanced technologies

TABLE 1: Continued.

1st author, year of publication, country	Discipline	Context/setting	Complexity/problem/s that this approach is addressing	Approach	Theoretical basis for the approach	Evidence of effectiveness	Potential relevance for families where a parent has a mental illness?
Gong, 2016 [21], Korea	Marketing	Sales people and their business customers	How to improve customer satisfaction and loyalty, market share, and financial performance through customer engagement	Study investigates customers' task complexity as a predictor of creative customer behaviour. Customers can become proactively involved in coproducing a solution	When context perceived as supporting autonomy and promoting competence, perceived locus of control shifts from external to internal, leading to increased intrinsic motivation [49]. A challenging environment can offer opportunity for personal development and accomplishment	Yes—study confirms the positive mediating role of customer stress	If you think of families as customers, there is benefit to borrowing the framework and lessons learned: stress, motivation, and personal resources
Goodwill, 2021 [30], Canada	Design	Social and public sector	How power, privilege, and the social structures (norms, roles, rules, assumptions, and beliefs) impact service design in the social and public sector	Seven expert interviews with service designers, experienced in social and public sector design projects were conducted to investigate power issues in design	Social theory concept of power and interviewee perspectives of how power manifests in design practice; they develop a power literacy framework in service design. The framework comprises five forms of power found in design practice: privilege; access power; goal power; role power; and rule power. This builds on Ross [50] and Castells' [51, 52] network theory of power	Framework may be applied to further develop power literacy and reflexivity in service design. The complexity of service design increases the need to reflect on power dynamics. Service design practices that make use of reflexivity to develop power literacy may contribute to better practices	Professionals should be cognizant of the impact of power on their relationships with parents and the role of wider organisational and systemic factors in creating and maintaining imbalance in power. Professionals can form more positive partnerships with service users if they focus on engaging service users and working with them, "power together," rather than asserting "power over" [53]
Gopi, 2020 [24], Malaysia	Food and nutrition	Food trucks' service quality	Factors involved in customer satisfaction and loyalty	Survey of a random sample of food truck customers	Broadly the focus is on service quality and some of the relevant literature is summarised including Parasuramn et al.'s [54] scale of service quality which includes five indicators of quality: specific tangibles; reliability; responsiveness; assurance; and empathy	The underlying theme is that high-quality service is part of customer satisfaction, and customer satisfaction will result in customer loyalty. Findings suggest tangibles, reliability, and assurance are associated with satisfaction	Yes, in terms of the relationship between service quality and user satisfaction
Gupta, 2020 [31], India	Business (e-commerce)	Online shopping	Improving customer decision-making to promote purchasing behaviours	Not an approach per se... but the eight dimensions in the theoretical basis form an approach to customer engagement	Eight dimensions of customer competency: e-trust; quality of products and services; customer support; application design; reasonable price; availability of user-generated content; replacement and returns; and risk in purchasing products	Three dimensions of competency (application design, reasonable price, and user-generated content (UGC)) will impact significantly the decision making performance of firm	Maybe highlighting the importance of user generated content and the eight dimensions

TABLE 1: Continued.

1st author, year of publication, country	Discipline	Context/setting	Complexity/problem/s that this approach is addressing	Approach	Theoretical basis for the approach	Evidence of effectiveness	Potential relevance for families where a parent has a mental illness?
Hernandez Romero [55], 2021, Belgium	Architecture	A housing project in Brussels	Promoting end user participation in housing design through principle of "design justice"	The design justice approach involves community participatory methods. A method called actor link mapping and analysis (ALMA) is used to explore the process	Yes, Latour's [56] actor-network theory and an extension of Costanza-Chock's [57] theory of design justice to architectural design	Yes, the findings of the network analysis and mapping are presented	Yes, the approach of design justice, the theoretical perspectives, and the approach to mapping and analysing the processes are all of potential relevance
Huang [33], 2019, China	Marketing	Migrant communities (survey)	Essential drivers of perceived life satisfaction amongst low subsistence migrant workers in Shanghai	Social production theory	Social production theory—social production functions rest on satisfying universal needs on the one hand and instrumental needs on the other. Social production function theory views human beings as actively shaping and reshaping their activities to attain goals	Instead of being passive recipients of experiences, subsistence migrant workers cognitively process their urban living environment experiences and adapt their expectations, perceptions, and behaviours to cope with the environment and increase life satisfaction	Linked specifically to migrant workers so hard to transfer, although some of the key messages are what we already know—social connectedness and sense of control is key and that government should intervene to facilitate family well-being and support social networks through developing community resources and trust
Kuehnl [58], 2019, ESA/ Europe	Marketing	Consumer industries such as home appliances financial, services, system catering, transportation	Role of customer journey design (CJD) on consumer behaviour in complex and digitalized consumer markets	Explored consumer perspective to define an effective CJD, explicate the key components of the construct, and create a scale to measure it from a consumer perspective	They propose that an effective CJD—based on the consumer's processing of procedural information along the customer journey—and brand experience—based on the consumer's experiential responses—are two distinct but interrelated value drivers of a customer experience	An effective CJD might help manage the complexity of customer journeys. Practitioners can use the scale to evaluate, monitor, and benchmark CJD	Possible relevance to further considering the service user experience using mapping
Kumari [59], 2014, India	Marketing	Theoretical paper/review	Barriers to rural marketing	Using interpretive structural modelling (ISM) identified barriers was respect to their driving power and dependence	In this study, ISM is used to model the barriers to successful rural marketing	The ISM model acts as a tool to allow marketers to understand barriers and their interrelationships to rural marketing in India	Potentially, in terms of using interpretive structural modelling to consider the systemic issues involved

TABLE 1: Continued.

1st author, year of publication, country	Discipline	Context/setting	Complexity/problem/s that this approach is addressing	Approach	Theoretical basis for the approach	Evidence of effectiveness	Potential relevance for families where a parent has a mental illness?
Lanzarone, 2017 [60], Italy/ France	Business (operations)	Community—home care (HC) services	Planning for service quality in context of uncertain patients' demands and operators' availabilities	The tool consists of a desk equipped with an interactive map, where up to four planners can manage the information together	Yes	The prototype has been tested with real HC planners and expert users; outcomes show the capability to meet the gap between planners and information complexity and to provide adequate support for replanning HC activities	Findings focused on nursing home setting but may be relevant
Lukáš, 2016 [61], Czech Republic	Business (operations)	Supplier-customer systems (in the brewing industry)	Disorder and uncertainty in the operational in supplier-customer systems	Attempting to measure operational complexity	Information theory provides a framework for quantifying system complexity, especially in terms of disorder and uncertainty. Business economics identifies two types of complexity of supplier-customer systems: structural complexity and operational complexity. To understand a supplier-customer system, it is suggested you need to understand the supplier, the customer, and the interface between them	Yes, the findings from two case studies are presented which suggest that there are approaches to measuring complexity	Yes, identifying and measuring the factors which contribute to complexity may be useful
McGregor, 2017 [62], Canada	Business (consumers)	Position paper	Consumer policy governance models	This paper profiled three approaches to conceptualizing governance that can accommodate the complexity inherent in consumer policy. The authors reflect on the need for policies that empower the consumer and those which are flexible, coevolving, and interconnected	Complexity theory: complexity refers to something with many parts combined in an intricate arrangement (i.e., interrelated linkages), making it difficult but essential to understand and analyse the whole [63]. Complexity requires a multisector approach to managed consumer policy initiatives and interests that converge and diverge. Consumer policy governance can complicate the complexity imperative but this should be accommodated	N/A	The concept is transferable: "policy governance requires that people purposefully connect, seek perspectives, identify missing voices, and gather unknown values for policy development [64]. For this to happen in the consumer policy arena, complexity has to be respected in both government and in governance" (p.2)

TABLE 1: Continued.

1st author, year of publication, country	Discipline	Context/setting	Complexity/problem/s that this approach is addressing	Approach	Theoretical basis for the approach	Evidence of effectiveness	Potential relevance for families where a parent has a mental illness?
Melton, 2015 [65], USA	Marketing	Survey of a range of businesses from finance, healthcare, education, technology, legal, transport, government, agriculture, public records, research, and entertainment services. $N = 160$	Customer and employee cocreation of new service developments	Customer collaboration can increase innovation. Process complexity has a positive effect on innovation	Uses complexity theory to propose and test a model in which the effect of customer, front line employees, ad cross-functional teams' involvement on service innovation is mediated by process complexity	Other studies have found that involving customers, frontline staff, and cross-functional teams in the design of services has no effect, but involvement in the design stage can increase radical innovation in service design. It is important at which stage consumers are involved to generate ideas and develop concepts providing greater potential for innovation	Importance of involving all actors in the design process which will hopefully improve innovation and while it does increase with complexity the more people who are involved, it ultimately benefits the process. "Complexity theory applied to learning cocreation [66] suggests that the synergies of a complex adaptive system generate more ideas and yield more creative solutions." (p. 120)
Nurjono, 2019 [67], Singapore	Health and social care	Regional health systems	Elderly patients with complex healthcare needs who consumed high levels of hospital resources	Transitional care program (postdischarge). Care coordinator (CC) allocated as integrator, responsible for coordinating the delivery of services. Used integrated information system	Evidence for transition care programs. Used implementation theory to evaluate the program implementation—conceptual framework of implementation fidelity (CFIF)	Providers experienced the program as a complex intervention—needed to be tailored for individual users. Detailed protocols meant higher adherence to the program—easier for assessment than for the care planning	Each family allocated a care coordinator

TABLE 1: Continued.

1st author, year of publication, country	Discipline	Context/setting	Complexity/problem/s that this approach is addressing	Approach	Theoretical basis for the approach	Evidence of effectiveness	Potential relevance for families where a parent has a mental illness?
Raubal, 1998 [68], Austria/Germany	Architecture	Wayfinding in airport (built environment example)	How people actually process wayfinding tasks and space	Proposes a computational method that incorporates choices and clues	Naive geography [69] promotes the development of formal models of geographic space that match with human cognition. Arthur and Passini [70] wayfinding principles need to be considered in the architectural design process "the built environment and its parts should function as a communication device" (p. 899). "Fewer decision points on any route and redundancy in wayfinding information are also facilitating effects." (p. 899). Other computer models are referred to	Application of model within two wayfinding tasks within airport settings	3 critical elements in their model: choices decision points in wayfinding; clues: people use clues to make decisions; image schemata—recurring patterns that people recognise and promote understanding and reason. Important to understand how people make decisions on how choices/clues are presented and decisions are processed based on prior knowledge and experience. Importance of creating a familiar landscape both to add decision making and for individuals to locate where they are in the process
Simmons, 2016 [71], UK	Public administration	Three public service areas: social care, leisure services, and housing	How more positive and productive relationships might be constructed between the users and providers of public services	Not one approach per se, focus on relational nature within public services and the role they have in enabling change	Grid-group cultural theory (CT) as a way to structure the complexity of public service relationships. CT based on 2 dimensions in social organization (Durkheim): "social regulation (corresponding with 'grid") and social integration (corresponding with "group"). "High grid" cultures are heavily constrained by rules and ascribed behaviour, "low grid" cultures much less so. Meanwhile, in "high group" cultures, group membership is strong. In "low group" cultures, it is much weaker"	Patterns of social relations that matter most to service users occur when social relations and cultural biases are mutually supportive of each other. . .a relational component to service provision adds value beyond that of simple technical competence. Also, points of conflict can be used for cultural innovation. . .an ongoing iterative nature. Using the analysis to create change on an institutional/ organisational level successful	Reminiscent of organisational learning—using user voice and points of conflict to reimagine service provision. Highlighting the possibility of change but also the unfinished nature of it—need to set up systems that are iterative, have opportunity for user feedback to create change, promote as not something that can be optimised but that solutions "will only ever be partial, contingent, and provisional." Points to the importance of user voice in design

TABLE 1: Continued.

1st author, year of publication, country	Discipline	Context/setting	Complexity/problem/s that this approach is addressing	Approach	Theoretical basis for the approach	Evidence of effectiveness	Potential relevance for families where a parent has a mental illness?
Sweeney, 2012 [72], UK	Health and social care	Community mental health teams	Service-user-defined continuity of care and its relationship to a range of health and social outcomes	High continuity of care related to having needs met and better therapeutic alliances, unrelated to empowerment	Continuity of care is a multidimensional construct that should centralize service users' experiences. Authors previously developed a multidimensional measure of continuity of care. This is the first time a service user-defined measure of continuity of care has been used in such a study	Service-user continuity of care is a measurable construct underpinned by preconditions, staff-related and care contacts. Clinicians have an important role to play in supporting service users to navigate the complexities of the mental health system. Nice measures are used in this study	Yes. Service users lack easy access to the services they feel they need as well as lacking information, despite needing to negotiate complex systems. Without information, they cannot negotiate the system
Trevisan, 2019 [73], Italy	Computing	Internet service providers	Subjective quality of experience (QoE) of internet service providers	Automated monitoring of web performance using passive data	Theories related to monitoring web performance	Yes, data about how it correlated to other data collected	Maybe… in the context of thinking about what passive data could be collected from existing big data sets that could help monitor access/usage of supports
Trischler, 2018 [74], Sweden/Austria	Design	A theme park and university on the Gold Coast of Australia	Understanding customer experience through different design methods	Three design methods: personas; observations (both developed from empathy design); and collaborative service mapping	Empathy service design "a creative, human-centred and iterative approach to service innovation" ([75], p. 109)	The article presents the strengths and limitations of each of the approaches. It recommends using multiple methods, different data sources, and participatory approaches for understanding customer experiences	Yes, all three approaches could be applied to exploring families' experiences of services
Wang, 2020 [76], China	Design	Public transport for the elderly	Designing a public transport system that meets the needs for the elderly	Empathy research to understand older people's travel on public transport and proposes a travel system plan based on physical and psychological characteristics	Empathetic research, 4 step process: (1) strategic focus/user identification; (2) observing/data capturing; (3) analysis/data interpretation; (4) brain storming solutions/visual concepts (or first prototypes)	Humanized design can inform services—tackling stress points, e.g., in older adults, this may relate to declining eyesight, physical safety, and difficulty accessing information. Empathetic map of travel produced with 5 domains: tasks; influences; overall goals; pain points; feelings	Interesting discussion about some of the barriers and concerns facing older people trying to navigate public transport independently which may have relevance and use empathy design to understand some of these issues relating to anxiety, response times, and stressful situations. Empathetic map may be a useful way to design of services

TABLE 1: Continued.

1st author, year of publication, country	Discipline	Context/setting	Complexity/problem/s that this approach is addressing	Approach	Theoretical basis for the approach	Evidence of effectiveness	Potential relevance for families where a parent has a mental illness?
Wendland, 2019 [77], Brazil	Health and social care	Mobile emergency care services (MECS)	Promoting the efficiency and effectiveness of health interventions by the use of information technology installed on smartphones	Initial qualitative focus group followed by survey	Health information technology drastically changes the way health care is provided and received/experienced	The article discussed facilitators and barriers for the use of health information technology. Barriers include resistance to change, technological complexity, and facilitators include technical support, compatibility, performance expectancy, and easy to use	Health technologies have the potential to improve health care, including performance of service providers, quality of care, cost reduction, better access to health information, and greater patient interaction with their own care
Witherspoon, 2010 [26], USA	Accountancy	Accountancy clients	How the medium and complexity of the message can improve client understanding, satisfaction, and retention	Looks at different types of communication and the impact on cues, convenience, reflection, and clarity. When to use e-mail, phone, in person, video conferencing, and texting	No	N/A	Good reminder that different types of messaging impact in different ways: conclusion is that accountants should take into account how the method affects people's understanding of messages and perceptions of service
Woodcock, 2018 [78], UK	Design	Computer activity-based design for older users	Design phase components to meet the needs of older computer users	Identifying components of the design stage that meet users' needs, e.g., ensuring understanding, skill set, user environment, and user-to-user support	They provide a breakdown of the approach which has an empathy focus but the theory underpinning this is less clear	Unclear	Yes, with regards to the design and development of tools with users in mind
Yadav, 2021 [79], Australia	Urban science	Discussing design methods	Homelessness	Applying "perceptive design" to synthesize quantitative data analytics and lived experience qualitative accounts	Perceptive design relies on the nuances of considered human perspectives to guide problem solving processes	Use of perceptive design research methods can lead to evidence-based design justice, using lived experience to influence both top down and bottom up approaches	Interesting use of life maps that synthesise data and experience to move us past empathizing to perceiving
Yu, 2018 [80], Taiwan	Computing	Primary school classrooms (Grade 4 students)	Learning aids system to help school-age children learn	Understand children's learning through interactions	Theory used is empathic design, where the focus is on the feelings, experience, creativity, and understanding of users. The main procedure is participant observation, in this case to describe the behavioral phenomenon of school-age children	Provides a mind map of school children's learning aids system design—what could be used for what purpose	Possible use of mind mapping to inform design

TABLE 1: Continued.

1st author, year of publication, country	Discipline	Context/setting	Complexity/problem/s that this approach is addressing	Approach	Theoretical basis for the approach	Evidence of effectiveness	Potential relevance for families where a parent has a mental illness?
				ehealth tools for conducting clinical assessments and monitoring and observing mental distress. iHealth tools (intelligent health) use real-time self-monitoring in the patient environment together with data processing and data mining to support personalized decision making. AI tools for supporting clinical decision making. Therapy delivered via apps/websites and social networking		Systematic lit review. Three areas for AI—(a) applications of AI technologies; (b) ethics of public engagement; (c) public engagement in the planning, development, implementation, evaluation, and diffusion of AI technologies. Four principles for inclusion of people in AI in MH care: (1) Technologies should sustain, heal, connect, and empower people and communities. (2) Design focused on the concerns of the community over the intentions of the designer. (3) Accountable, accessible, and collaborative process describing how patients and the public have been involved. (4) Build and use shared knowledge to support inclusion in design	
Zidaru, 2021 [81], UK	Design	Mental health care setting	Person and patient involvement in use of big data and machine-learning software (ehealth, ihealth, AI tools)		Conceptual framework draws on design justice perspectives, sociology of digital health interventions, the anthropology of scientific expertise and advances in transdisciplinary knowledge mobilization (KM), all of which can inform policy oriented research and public engagement through coproduction or codesign methodologies		Design principles for developing navigation tools have user voice at their core in design. Interesting to consider what AI currently available for whole of families (rather than individuals with MI within the family)

These studies offered further insights into why complexity is important and can be challenging. McGregor [62] in her work on consumer policy and governance reported that "Complexity thinking assumes people can adapt, that complex behaviour emerges from a collection of single acts, and that order emerges without a central control process. It assumes that small changes and leverages can have big effects across a network. Systems are embedded in other systems and their interdependency matters." (23, p. 686). She concludes that policy governance therefore needs people to connect and seek the perspectives of others, especially those who may not already be involved and/or have been excluded. In a physical design-oriented example, examining the design of airports, Raubal and Egenhofer [68] used the concept of wayfinding to explore how people obtain and process information to navigate complexity. They found that three important components to consider are decision points; the clues and information that people use to make decisions; and the importance of people's previous experiences. Coskan et al. [45] found that crowding and messiness in shops increased service users' confusion and negative reactions to the experience. Although most studies focused on the challenges, Melton and Hartline [65] reported that service user involvement or cocreation can promote innovation in developing services, "Complexity theory highlights the roles of adaptive tension, enabling leadership, interconnectedness between people to enhance cooperation and learning and boundary spanning with actors outside the system to bring new thinking and perspectives into the system." (p. 114).

In these applied studies, the importance of involvement and relationships was also repeatedly reported. In a study of the design of a virtual library environment, Clarke [43] found that the use of avatars was important to facilitate engagement. Coley and Lemon [44], in their work in the car industry, emphasised the crucial importance of understanding service users' needs and of including multidisciplinary perspectives. Blasco-Arcas et al. [39] also reinforced the positive role of interactivity and personalization in their research on online services. Simmons [71] explored the importance of relationships in difference aspects of public services and found that the cultural context of services was also necessary to consider and that it was also helpful to approach service user involvement as an ongoing and iterative process. Influenced by empathy design approaches, Trischler et al. [74] proposed the use of a range of methods to better understand complex environments (a theme park and a university) including the use of personas (in-depth interviews about a service user's wider life and experiences), observations, and collaborative service-mapping. Wang and Cheng [76] reported the use of an empathy map to help understand and respond to the experiences of older people using public transport. They presented the empathy mapping process in four main stages: "Step 1: tasks–what tasks are users trying to accomplish? Step 2: feelings–what is the user's experience? What affects their user experience? Step 3: environment/influence/pain spot–which person, object, or place will influence the user's behavior? What is the ultimate goal of the user? Step 4: solutions (plan)\, brainstorming, designing concept visual

presentation, and the acknowledgement of the effectiveness of the design." (p. 321). Woodcock et al. [78] also emphasized the importance of empathy in their work with designing services with older service users. Yu et al. [80] employed an empathy design approach to explore how to better support children's learning and so focused on the children's feelings, creativity, and experiences.

A further theme in the researching testing service developments and interventions was the importance of power and the concept of design justice. Hernandez Romero and Pak [55] presented the application of design justice, which seeks to address issues of equity and involvement in the design process, to a housing project. They used a process called actor link mapping and analysis to collect data from everyone involved and they presented it through network maps to facilitate further discussion and design. Yadav et al. [79] also promoted the importance of design justice and the crucial role of understanding service users and using other sources of data to enable an evidence-based approach, in this case to addressing homelessness.

There were a number of other specific approaches to navigating complexity. These included the design of a tool to personalise online searching [40]; an approach to integrating IT systems to improve service delivery [47]; a multiuser tool, in the form of an interactive map, for planning home care services [60]; a method for measuring complexity in the brewing industry to better understand the structural and operational issues involved [61]; and the use of smartphones to enable access to health information [77].

3.5. Specific Service Developments to Support Families Navigate Health and Social Care.
All of these service developments present potential learning for how to effectively support families to navigate the complexities of services. Nonetheless, the third and final groupings of included articles were those which reported on service developments which were directly applicable to supporting families.

Brooks et al. [41] aimed to map services for children with complex needs and explore the service user, carer, and service provider experiences of those multiagency processes. They found that "the problems encountered by families were generated by an absence of a whole system-level model of care...[and]...families not only need to navigate the labyrinth of the healthcare and social care systems but also be adept at distinguishing the responsibilities and expertise held by practitioners of different professions." (p. 60). Two other service developments overlap with the Patient Navigator Programmes reviewed by Kokorelias et al. [17]. An online tool, aimed to improve access to information and service users, participate in their cancer care, was evaluated by de Looper et al. [48]. It included a range of forms of information including animations of treatment, videos of other service users' experiences, and clips of service providers explaining different aspects of services. The online format also allowed for service users' meetings with providers to be recorded. They found that people used the information aspects of the tool to prepare for using services but used the more personalised and recording functions less.

Nurjono et al. [67] examined the use of a care coordinator to promote the care of older people with complex needs. Similar with many PNPs, the main focus was on the effectiveness of the role of the coordinator rather than empowering the service user/s. Sweeney et al. [72] in their work on continuity of care in mental health services emphasized the importance of the service user's perspective of what is helpful in promoting the continuity and effectiveness of care. Finally, Zidaru et al. [81] conducted a systematic scoping review of patient and public involvement in AI-assisted mental health care. They developed four principles to promote justice in these design processes: (1) technologies should sustain, heal, connect, and empower people and communities; (2) design should be focused on the concerns of the community over the intentions of the designer; (3) there should be an accountable, accessible, and collaborative process describing how patients and the public have been involved; and (4) we should build and use shared knowledge to support inclusion in design.

4. Discussion

An initial and striking aspect of the results of the review was the consistency, across disciplines, services, and sectors, of the focus on service users' expectations, understandings, and experiences in determining what works well and how services should be developed [22, 23]. Although this is increasingly an aspect of much research in health and social care, these perspectives from other disciplines were a reminder of how central the service user experience should be in all aspects of health and social care and the importance of exploring people's previous contact with, and understanding of, services. Boulding et al. [23] also provided some interesting nuance on how expectations may be developed over time and the associated importance, therefore, of reliable and consistent service.

Another aspect of the included studies was the focus on the physical design of services to help manage complexity and promote service user satisfaction whether in shops [45], airports [20, 68], universities, or theme parks [74]. For example, Coskun et al. [45] discussed the potential for information overload for shoppers, including human crowding and store messiness, which can contribute to confusion and so negative shopping behaviour. For the development of new services, and certainly new health and social care buildings, physical design and its relationship with service user experiences and outcomes are increasingly and actively considered. Conversely, it seems to be relatively unusual for to have ongoing processes in which physical design of settings is evaluated, updated, and improved beyond specific safety concerns [82].

Perhaps, the main and most common theme throughout the included research was the central importance of involving service users in all aspect of service design and delivery, especially in the early stages of service development and in promoting positive relationships throughout. Given its overlap with the therapeutic literature, it was interesting that the importance of empathy in design, service development, and delivery was repeatedly highlighted [27, 28, 78, 80]. It could be argued that the importance of empathy and relationships has been well established for specific psychological interventions and, to some extent, in mental health services more generally [34], but their importance for all interactions with health and social care may need to be further reinforced. Service user involvement, often referred to as personal (or sometime patient) and public involvement, is now usually a requirement in the development of health and social care services [83]. There is ongoing research and debate about the complexities involved in these partnerships but, from the other disciplines and service areas, this did not seem to attract a similar level of reflection or concern about possible barriers, and there seemed to be a clear acceptance that involvement is a routine, necessary, and important aspect of developing effective services and promoting service user satisfaction. It was also important to note the inclusion of the overlapping themes of power [30] and justice [55, 79] in why and how to involve service users from the research from other disciplines.

The range of approaches from across the disciplines also suggested there may be possible categories of approaches, which are also relevant to efforts focused on supporting families to navigate health and social care services and could help the further development of such approaches. The possible broad categories of approaches include physical design; information; involvement and relationship development; and approaches to promote justice, choice, and control. Arguably service providers should be considering how they can develop their services across all aspects of these approaches but organising them into broad categories may facilitate that exploration.

Approaches to physical design provide an excellent opportunity to involve service users and to explore what aspects of the design of settings can promote people's ability to navigate complexity as well as their overall satisfaction with services [20, 45, 68, 74]. In relation to informational approaches to support families navigate the complexities of health and social care, research from other disciplines highlighted the importance of these being codesigned, the need to make information accessible using a range of formats, and for it to be delivered in an engaging, interactive, and personalised way. Examples ranged from the use of avatars to help people navigate library services [43] through interactive engagement for online services [32] to an online tool for preparing to use cancer services [48]. The use of a variety of mapping approaches to provide information and explore understanding also appeared including service mapping [74], empathy mapping [76], and service user journey mapping [58]. These approaches sounded similar to the Empower Journey Map Project [14] already being used with families, and it could be useful to explore how this could be included in routine practice. Approaches to involvement and relationship development emphasized the centrality of empathy including, more specifically, better understanding the service users' experience of services [27, 28, 78, 80]. Finally, the research from other disciplines highlighted the role of power and issues of justice which should be considered across all possible approaches to complexity [30, 55, 79].

An important caveat is that if approaches to supporting families to navigate complex services do not consider service users' needs and codevelop services with users, they risk becoming just another intervention, in addition to all the others, which could add to the complexity rather than help navigate it. As family service users are not a homogenous group, no approach to equip them to navigate the complexity will fit everyone. A combination of approaches is likely to be needed that fits a continuum from self-directed to a more supported navigation process such as the PNPs.

It is also important to note that while increased complexity can be stressful and create difficulties for access, coordination, communication, and effectiveness, it can also create opportunities to stimulate cooperation, creativity, innovation, and radical change [21, 65].

There are a number of limitations of the scoping review which should be acknowledged. While the wide range of disciplines was a key strength of this review, the broad scope limited the opportunities to explore any specific discipline in great depth. Although the number of disciplines included was high compared to most conventional scoping reviews, it was by no means comprehensive and so there may be further perspectives from disciplines not included in this review. While the broad scope of disciplines was an intentional strategy to bring new ideas, the research team's lack of familiarity with the associated specialist knowledge and language provided a further limitation to refining the search strategy and accessing an informed perspective on their approaches. The research team, therefore, may not have been able to identify the relevance of more specialist developments from other disciplines for health and social care. A possible opportunity to address these limitations could be to work directly with people working in other disciplines to better identify and understand potential learning and innovation.

5. Conclusion

This very broad scoping review identified key learning from multiple and diverse disciplines, thereby helping understand and inform how service users, such as families with experience of parental mental health challenges, could effectively be supported to navigate the complexities of health and social care services. The review provides clear, helpful, and relevant findings in relation to the physical design of services; providing information; involvement and relationship development; and approaches to promote justice, choice, and control. A central theme has been the importance and benefits of involving service users in all aspects of service development and implementation although the challenges of doing this effectively and consistently should also be acknowledged. The next obvious step, therefore, is to work directly with families who have experience of trying to navigate complex services to better understand their experiences and codesign and test an approach or combination of approaches to manage the complexity of services and improve families' outcomes.

Data Availability

A detailed data extraction table has been included in the supplementary materials.

Additional Points

What is known about this topic? (1) Managing the complexity of engaging with multiple professionals and services can increase service users' stress. (2) This is demonstrated in the literature on families, with parental mental health challenges, who often have complex needs and are in contact with a wide range of different services. (3) There is potentially valuable learning from exploring approaches to navigating such complexity from a range of disciplines. What this paper adds? (1) Learning from across disciplines includes the need to focus on service users' expectations, understanding, and experience of services. (2) Other disciplines, beyond health and social care, reinforce the importance of considering the relationship between service design and service user behaviour. (3) The benefits of involving service users in the development and delivery of services are highlighted across disciplines.

Conflicts of Interest

The authors declare there are no conflicts of interest.

Supplementary Materials

A detailed data extraction table. (*Supplementary Materials*)

References

[1] L. Montgomery, G. Wilson, S. Houston, G. Davidson, and C. Harper, "An evaluation of mental health service provision in northern Ireland," *Health and Social Care in the Community*, vol. 27, no. 1, pp. 105–114, 2019.

[2] C. McCartan, G. Davidson, M. Donaghy et al., "Are we starting to "think family?" evidence from a case file audit of parents and children supported by mental health, addictions and children's services," *Child Abuse Review*, vol. 31, no. 3, 2022.

[3] R. M. Goerge and E. R. Wiegand, "Understanding vulnerable families in multiple service systems understanding vulnerable families," *RSF: The Russell Sage Foundation Journal of the Social Sciences*, vol. 5, no. 2, pp. 86–104, 2019.

[4] Productivity Commission, "Mental health," Report no. 95, A. Government, Australia, 2020.

[5] State of Victoria Royal Commission into Victoria's Mental Health System, "Summary and recommendations, parl paper No. 202, session 2018–21," Final Report, State of Victoria, Melbourne, Australia, 2021.

[6] T. Spratt, "Families with multiple problems: some challenges in identifying and providing services to those experiencing adversities across the life course," *Journal of Social Work*, vol. 11, no. 4, pp. 343–357, 2011.

[7] T. Horton, J. Illingworth, and W. Warburton, "The spread challenge: how to support the successful uptake of innovations and improvements in health care," 2018, https://www.health.org.uk/publications/the-spread-challenge.

[8] A. Shiell, P. Hawe, and L. Gold, "Complex interventions or complex systems? Implications for health economic evaluation," *BMJ*, vol. 336, no. 7656, pp. 1281–1283, 2008.

[9] J. Nicholson, "Risks linked with parental mental illness and substance use are undeniable, but efforts to scale-out and sustain evidence-based practices are challenging," *Frontiers Science News*, 2021.

[10] Eastern Regional Coordinators, *Eastern Navigation Resource: Unravelling Pathways to Health and Community Supports*, Eastern Regional Coordinators, Melbourne, Australia, 2022.

[11] M. Donaghy, G. Davidson, and S. Crawford, "Northern Ireland Champions initiative," in *Parental Mental Health and Child Welfare Work*, pp. 85–89, Pavilion, Teddington, Middlesex, 2017.

[12] A. Falkov, *The Family Model Handbook: An Integrated Approach to Supporting Mentally Ill Parents and Their Children*, Pavilion, Teddington, Middlesex, 2012.

[13] S. Lagdon, A. Grant, G. Davidson et al., "Families with parental mental health problems: a systematic narrative review of family-focused practice," *Child Abuse Review*, vol. 30, no. 5, pp. 400–421, 2021.

[14] N. Nidey and S. Weber, *Empower Journey Map Project*, Cincinnati Children's Hospital, Cincinnati, OH, USA, 2022.

[15] C. Devaney, B. Brady, R. Crosse, and R. Jackson, "Realizing the potential of a strengths-based approach in family support with young people and their parents," *Child & Family Social Work*, vol. 28, 2022.

[16] M. Ungar, "Families as navigators and negotiators: facilitating culturally and contextually specific expressions of resilience," *Family Process*, vol. 49, no. 3, pp. 421–435, 2010.

[17] K. M. Kokorelias, J. E. Shiers-Hanley, J. Rios, A. Knoepfli, and S. L. Hitzig, "Factors influencing the implementation of patient navigation programs for adults with complex needs: a scoping review of the literature," *Health Services Insights*, vol. 14, 2021.

[18] S. S. Andaleeb and A. K. Basu, "Technical complexity and consumer knowledge as moderators of service quality evaluation in the automobile service industry," *Journal of Retailing*, vol. 70, no. 4, pp. 367–381, 1994.

[19] D. Benazic and N. Varga, *Service Quality and Customer Satisfaction in Business Consulting Services: An Importance-Performance Analysis Based on the Partial Least Sqaure Method*, Varazdin Development and Entrepreneurship Agency (VADEA), Varazdin, 2018.

[20] V. Bogicevic, W. Yang, A. Bilgihan, and M. Bujisic, "Airport service quality drivers of passenger satisfaction," *Tourism Review of AIEST-International Association of Scientific Experts in Tourism*, vol. 68, no. 4, pp. 3–18, 2013.

[21] T. Gong and J. N. Choi, "Effects of task complexity on creative customer behavior," *European Journal of Marketing*, vol. 50, no. 5/6, pp. 1003–1023, 2016.

[22] J. Finsterwalder and S. Tuzovic, "Quality in group service encounters: a theoretical exploration of the concept of a simultaneous multi-customer co-creation process," *Managing Service Quality: International Journal*, vol. 20, 2010.

[23] W. Boulding, A. Kalra, and R. Staelin, "The quality double whammy," *Marketing Science*, vol. 18, no. 4, pp. 463–484, 1999.

[24] B. Gopi and N. Samat, "The influence of food trucks' service quality on customer satisfaction and its impact toward customer loyalty [Article]," *British Food Journal*, vol. 122, no. 10, pp. 3213–3226, 2020.

[25] V. Dixit, A. Chaudhuri, and R. K. Srivastava, "Assessing value of customer involvement in engineered-to-order shipbuilding projects using fuzzy set and rough set theories," *International Journal of Production Research*, vol. 57, no. 22, pp. 6943–6962, 2019.

[26] C. L. Witherspoon, "Creating compelling client communications: certified public accountant," *The CPA Journal*, vol. 80, no. 4, pp. 10–12, 2010.

[27] C. L. Bennett and D. K. Rosner, "The promise of empathy: design, disability, and knowing the "other"," in *Proceedings of the Conference on Human Factors in Computing Systems*, Glasgow Scotland UK, May 2019.

[28] M. T. Cardador and M. G. Pratt, "Becoming who we serve: a model of multi-layered employee–customer identification," *Academy of Management Journal*, vol. 61, no. 6, pp. 2053–2080, 2018.

[29] J. Carlson, M. M. Rahman, P. J. Rosenberger, and H. H. Holzmüller, "Understanding communal and individual customer experiences in group-oriented event tourism: an activity theory perspective," *Journal of Marketing Management*, vol. 32, no. 9-10, pp. 900–925, 2016.

[30] M. Goodwill, M. van der Bijl-Brouwer, and R. Bendor, "Beyond good intentions: towards a power literacy framework for service designers," *International Journal of Design*, vol. 15, no. 3, 2021.

[31] V. Gupta, L. Gupta, and S. Dhir, "Customer competency for improving firm decision-making performance in e-commerce," *Foresight: The Journal of Futures Studies, Strategic Thinking and Policy*, vol. 22, no. 2, pp. 205–222, 2020.

[32] W. Gao, Y. Liu, Z. Liu, and J. Li, "How does presence influence purchase intention in online shopping markets? An explanation based on self-determination theory," *Behaviour & Information Technology*, vol. 37, no. 8, pp. 786–799, 2018.

[33] Y. Huang, R. Chu, and J. Cheng, "Exploring life satisfaction among subsistence migrant consumers: a case in China," *Journal of Public Policy and Marketing*, vol. 38, no. 1, pp. 96–109, 2019.

[34] M. J. Grant and A. Booth, "A typology of reviews: an analysis of 14 review types and associated methodologies," *Health Information and Libraries Journal*, vol. 26, no. 2, pp. 91–108, 2009.

[35] H. Arksey and L. O'Malley, "Scoping studies: towards a methodological framework," *International Journal of Social Research Methodology*, vol. 8, no. 1, pp. 19–32, 2005.

[36] M. D. Peters, C. M. Godfrey, H. Khalil, P. McInerney, D. Parker, and C. B. Soares, "Guidance for conducting systematic scoping reviews," *JBI Evidence Implementation*, vol. 13, no. 3, pp. 141–146, 2015.

[37] A. C. Tricco, E. Lillie, W. Zarin et al., "PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation," *Annals of Internal Medicine*, vol. 169, no. 7, pp. 467–473, 2018.

[38] J. Thomas and A. Harden, "Methods for the thematic synthesis of qualitative research in systematic reviews," *BMC Medical Research Methodology*, vol. 8, no. 1, pp. 1–10, 2008.

[39] L. Blasco-Arcas, B. I. Hernandez-Ortega, and J. Jimenez-Martinez, "Collaborating online: the roles of interactivity and personalization," *Service Industries Journal*, vol. 34, no. 8, pp. 677–698, 2014.

[40] G. Bosetti, A. Tacuri, I. Gambo et al., "ANDES: an approach to embed search services on the Web browser," *Computer Standards & Interfaces*, vol. 82, 2022.

[41] F. Brooks, L. Bloomfield, M. Offredy, and P. Shaughnessy, "Evaluation of services for children with complex needs: mapping service provision in one NHS Trust," *Primary Health Care Research & Development*, vol. 14, no. 1, pp. 52–62, 2013.

[42] L. Bertalanffy, *General Systems Theory: Foundations, Development, Applications*, George Braziller, New York, NY, USA, 1968.

[43] C. P. Clarke, "Second Life in the library: an empirical study of new users' experiences," *Program*, vol. 46, no. 2, pp. 242–257, 2012.

[44] F. J. S. Coley and M. Lemon, "Exploring the design and perceived benefit of sustainable solutions: a review," *Journal of Engineering Design*, vol. 20, no. 6, pp. 543–554, 2009.

[45] M. Coskun, S. Gupta, and S. Burnaz, "Human crowding and store messiness: drivers of retail shopper confusion and behavioral intentions," *Journal of Consumer Behaviour*, vol. 18, no. 4, pp. 313–331, 2019.

[46] M. Garaus, U. Wagner, and C. Kummer, "Cognitive fit, retail shopper confusion, and shopping value: empirical investigation," *Journal of Business Research*, vol. 68, no. 5, pp. 1003–1011, 2015.

[47] K. A. Dahleez, I. Bader, and M. Aboramadan, "E-health system characteristics, medical performance and healthcare quality at UNRWA-Palestine health centers [E-health system characteristics]," *Journal of Enterprise Information Management*, vol. 34, no. 4, pp. 1004–1036, 2021.

[48] M. de Looper, E. Smets, B. C. Schouten et al., "The Patient Navigator: can a systematically developed online health information tool improve patient participation and outcomes related to the consultation in older patients newly diagnosed with colorectal cancer?" *BMC Cancer*, vol. 22, no. 1, pp. 1–21, 2022.

[49] R. M. Ryan and E. L. Deci, "Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being," *American Psychologist*, vol. 55, no. 1, pp. 68–78, 2000.

[50] G. Ross, "Power and service design: making sense of service design's politics and influence," in *Proceedings of the Paper presented at the Conference on Service Design*, Kölle, Germany, October 2019.

[51] M. Castells, *Communication Power*, Oxford University Press, Oxford, UK, 2009.

[52] M. Castells, "A network theory of power," *International Journal of Communication*, vol. 5, pp. 773–787, 2011.

[53] J. Tew, "Understanding power and powerlessness: towards a framework for emancipatory practice in social work," *Journal of Social Work*, vol. 6, no. 1, pp. 33–51, 2006.

[54] A. Parasuraman, V. A. Zeithaml, and L. L. Berry, "A conceptual model of service quality and its implications for future research," *Journal of Marketing*, vol. 49, pp. 41–50, 1985.

[55] R. N. Hernandez Romero and B. Pak, "Understanding design justice in a bottom-up housing through digital actor-network mapping," in *Proceedings of the 39th International Hybrid Conference on Education and Research in Computer Aided Architectural Design in Europe*, Novi Sad, Serbia, September 2021.

[56] B. Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory*, Oxford University Press, Oxford, UK, 2005.

[57] S. Costanza-Chock, *Design Justice: Community-Led Practices to Build the Worlds We Need*, The MIT Press, Cambridge, MA, USA, 2020.

[58] C. Kuehnl, D. Jozic, and C. Homburg, "Effective customer journey design: consumers' conception, measurement, and consequences," *Journal of the Academy of Marketing Science*, vol. 47, no. 3, pp. 551–568, 2019.

[59] P. Kumari, N. Gupta, and S. Sindhu, "Modeling the barriers to rural marketing using the interpretive structural modeling approach," *The IUP Journal of Marketing Management*, vol. 13, no. 3, p. 7, 2014.

[60] E. Lanzarone, C. Masclet, and F. Noël, "A multi-user tool for enhancing the daily replanning and control of visits in home care services," *Production Planning & Control*, vol. 28, no. 3, pp. 202–219, 2017.

[61] L. Lukáš and M. Plevný, "Using entropy for quantitative measurement of operational complexity of supplier–customer system: case studies," *Central European Journal of Operations Research*, vol. 24, no. 2, pp. 371–387, 2016.

[62] S. L. McGregor, "Bringing complexity and convergence governance to consumer policy," *International Journal of Consumer Studies*, vol. 41, no. 6, pp. 685–695, 2017.

[63] S. L. T. McGregor, "Complexity economics, wicked problems and consumer education," *International Journal of Consumer Studies*, vol. 36, no. 1, pp. 61–69, 2012.

[64] Partners in Policy Governance, "Improving skills in policy governance: ownership linkage," 2017, http://www.policygovernanceconsulting.com/improvingskills-in-policy-governance/ownership-linkage.

[65] H. Melton and M. D. Hartline, "Customer and employee co-creation of radical service innovations," *Journal of Services Marketing*, vol. 29, 2015.

[66] D. A. Desai, "Co-creating learning: insights from complexity theory," *The Learning Organization*, vol. 17, no. 5, pp. 388–403, 2010.

[67] M. Nurjono, P. Shrestha, A. Ian Yi Han et al., "Implementation fidelity of a strategy to integrate service delivery: learnings from a transitional care program for individuals with complex needs in Singapore," *BMC Health Services Research*, vol. 19, 2019.

[68] M. Raubal and M. J. Egenhofer, "Comparing the complexity of wayfinding tasks in built environments," *Environment and Planning B: Planning and Design*, vol. 25, no. 6, pp. 895–913, 1998.

[69] M. J. Egenhofer and D. M. Mark, "Naive geography," in *International Conference on Spatial Information Theory*, pp. 1–15, Springer Berlin Heidelberg, Berlin, Heidelberg, 1995.

[70] P. Arthur and R. Passini, "1-2-3 evaluation and design guide to wayfinding," Technical Report, OttawaPublic Works Canada, Canada, 1990.

[71] R. Simmons, "Improvement and public service relationships: cultural theory and institutional work," *Public Administration*, vol. 94, no. 4, pp. 933–952, 2016.

[72] A. Sweeney, D. Rose, S. Clement et al., "Understanding service user-defined continuity of care and its relationship to health and social measures: a cross-sectional study," *BMC Health Services Research*, vol. 12, p. 145, 2012.

[73] M. Trevisan, I. Drago, and M. Mellia, "PAIN: a Passive Web performance indicator for ISPs," *Computer Networks*, vol. 149, p. 115, 2019.

[74] J. Trischler, A. Zehrer, and J. Westman, "A designerly way of analyzing the customer experience," *Journal of Services Marketing*, vol. 32, 2018.

[75] K. Wetter-Edman, D. Sangiorgi, B. Edvardsson, S. Holmlid, C. Grönroos, and T. Mattelmäki, "Design for value co-creation: exploring synergies between design for service and service logic," *Service Science*, vol. 6, no. 2, pp. 106–121, 2014.

[76] H. Wang and J. Cheng, "Design of the public travel reservation system for the elderly based on empathy research map," *Advances in Intelligent Systems and Computing*, vol. 1205, pp. 320–326, 2020.

[77] J. Wendland, G. L. Lunardi, and D. B. Dolci, "Adoption of health information technology in the mobile emergency care service," *RAUSP Management Journal*, vol. 54, no. 3, pp. 287–304, 2019.

[78] A. Woodcock, D. McDonagh, J. Osmond, and W. Scott, "Empathy, design and human factors," *Advances in Intelligent Systems and Computing*, vol. 607, pp. 569–579, 2018.

[79] P. Yadav, S. Patterson, A. S. Bilandzic, and S. Johnstone, "Evidence-based design justice: synthesizing statistics and stories—to create future "Just" Cities," in *Urban Informatics and Future Cities*, pp. 407–428, Springer, Berlin, Germany, 2021.

[80] H. C. Yu, C. J. Chou, D. B. Luh, and M. H. Hsieh, "User-centered empathy design: a prototype of school-age children learning aids system," *Journal of Ambient Intelligence and Humanized Computing*, 2018.

[81] T. Zidaru, E. M. Morrow, and R. Stockley, "Ensuring patient and public involvement in the transition to AI-assisted mental health care: a systematic scoping review and agenda for design justice," *Health Expectations*, vol. 24, no. 4, pp. 1072–1124, 2021.

[82] A. Johnston, G. Davidson, P. Webb et al., "Physical design of supported accommodation for people with mental health problems and intellectual disabilities: a scoping review," in *Proceedings of the Architecture Media Politics Society Proceedings Series*, virtual, online, December 2022.

[83] Department of Health, *Guidance for Health and Social Care Organisations on Arrangements for Implementing Effective Personal and Public Involvement*, Department of Health, Belfast, UK, 2012.