

Designing online forums to support health and wellbeing: guidance informed by self-determination theory and stakeholder perspectives

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Abstract

Background: The use of online forums to support health and wellbeing is widespread and growing, yet evidence of their safety and effectiveness is mixed. The absence of theory-informed guidance on how to design these forums, considering the expertise of forum users and moderators, is a barrier to improving outcomes. The development of evidence-based forum design guidance grounded in theory and lived experience could improve the efficacy and outcomes of these forums for the many people using them worldwide.

Objective: To draw on the experience and expertise of online forum users and staff, together with insights from existing research on wellbeing-supportive design and self-determination theory, to generate a set of theoretically grounded and evidence-based design guidelines for safe, healthy and well-being supportive online forums.

Methods: We conducted 52 semi-structured interviews with 36 forum users, 18 with forum staff, and four design workshops with forum staff. We combined these with input from a multidisciplinary research team with expertise in forum delivery and evaluation. Principles of qualitative framework analysis were used to adapt a pre-existing framework for designing well-being supportive technology to the context of online health forums.

Results: The resulting design guidelines for wellbeing supportive forum design are framed around four overarching principles relating to the psychological needs for autonomy, competence, and relatedness as defined by self-determination theory, and the additional need for safety in online forums. Each principle is provided with a series of pragmatic design heuristics and specific strategies that designers can use to promote the satisfaction of psychological needs in user experience and prevent harm.

Conclusions: User experience of online health forums shows that there is room for improvement with regard to how well these forums support basic psychological needs and safety. We have drawn on self-determination theory to respond to these findings by proposing a set of evidence-based guidelines for service development and refinement of online health forums. The guidance can be readily adapted to specific user groups across the diverse settings in which forums are hosted.

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Original Manuscript

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Abstract

Background

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We conducted 52 semi-structured interviews with 36 forum users, 18 with forum staff, and four design workshops with forum staff. We combined these with input from a multidisciplinary research team with expertise in forum delivery and evaluation. Principles of qualitative framework analysis were used to adapt a pre-existing framework for designing well-being supportive technology to the context of online health forums.

Results

The resulting design guidelines for wellbeing supportive forum design are framed around four overarching principles relating to the psychological needs for autonomy, competence, and relatedness as defined by self-determination theory, and the additional need for safety in online forums. Each principle is provided with a series of pragmatic design heuristics and specific strategies that designers can use to promote the satisfaction of psychological needs in user experience and prevent harm.

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Introduction

Online forums are a popular medium for text-based communication. Also referred to as discussion boards or online communities, their core function involves the ability to create discussion topics, known as threads, within which users can respond sequentially with their own messages, or posts [1]. Users can usually review a list of thread titles to access discussions most relevant to them. This facilitates asynchronous group interaction on topics generated by the community. Most forums are actively managed by moderators whose roles include ensuring forums remain safe, supporting users, and promoting community activity [2]. Forums typically allow free, anonymous, 24-hour access and therefore represent highly accessible and flexible means by which people can discuss shared interests and experiences.

There is a well-established literature related to online peer support forums designed to support health and wellbeing. Recent review studies highlight how forums established for and by people with a broad range of physical health conditions facilitate social connection and the exchange of health management advice derived from personal experience [3,4]. A review of forum experiences in young people seeking mental health peer support similarly identified informational and social support as primary reasons for forum use [5]. Mechanisms underpinning the effects of health forums include the normalization of distressing experiences, reduced isolation, convenient access to actionable information, and the empowering nature of supporting others [6].

Health forums are delivered in diverse contexts. Some are maintained by people with personal experience of health conditions using social media websites. Others are hosted on dedicated platforms run by health services, charities, or corporate providers. Moderation also varies significantly across forums. Moderators are commonly tasked with maintaining a safe environment by, for example, removing rule-breaking content. They may also be involved with directly supporting forum users. This can include providing support from a lived experience perspective or in the capacity of a trained supporter or health professional [7]. Evidence of the effectiveness of health forums is mixed, with some trials reporting positive impacts on outcomes such as distress, loneliness and self-efficacy, and others showing no significant impact on health outcomes [8–10]. Some users also report negative experiences, including exposure to distressing content and health misinformation [11,12].

Both the use of, and academic interest in, health forums is growing, and is likely to expand as the need for mental health support continues to outstrip access to more traditional in-person services [13,14]. It is therefore vital that those seeking to establish and promote health forums can access evidence-informed strategies to optimize their safety and effectiveness. Existing literature provides some guidance in this regard, recommending that forum hosts should aim to achieve sustainable growth and high levels of forum activity to avoid user disengagement and community stagnation

[15]. Specific strategies suggested for promoting engagement include seeking and welcoming new users, supporting and rewarding core members, and developing content such as newsletters to promote community visibility [15]. Online health forums also require skilled facilitation to promote engagement. Guidance for health professional moderation highlights the need for expertise in creating space for collaborative discussion, encouraging communication, and validating users' experiences, all within the constraints of a text-based format [16]. This advice, derived primarily from practitioners' experiences, provides important insight into how forums can be delivered effectively. To date, however, theory-informed guidance which draws on the expertise of those with both personal and professional experience of health forums is absent in this literature. This is significant in light of UK Medical Research Council guidance for the development of complex interventions, which emphasizes the value of theory for articulating how an intervention is expected to work and the importance of stakeholder perspectives in intervention development.[17]

To address this limitation, we report design guidance for health forums based on an adaptation of an existing technology design guidance framework [18] informed by self-determination theory (SDT). SDT is a broad theory of motivation, personality, and wellbeing with a strong empirical and applied basis spanning four decades of evidence across cultures and a variety of domains including health and psychology [19]. The theory posits that wellbeing is underpinned by the satisfaction of basic psychological needs for autonomy, competence, and relatedness [20]. Autonomy refers to the need to feel volition in relation to one's actions and that these actions align with personal values; competence reflects the need to feel capable and effective; and relatedness includes the need to feel connection and belonging. Our guidance builds on recent research using SDT to inform technology design in areas as diverse as games development and health behavior intervention. This work is predicated on the notion that across contexts, technology that supports psychological needs and avoids their frustration, will better support engagement and wellbeing [21,22]. Specifically, we have adapted a set of SDT-informed guidelines for wellbeing-supportive technology design by Peters [18]. These guidelines are derived from patterns of contextual and environmental factors that predictably lead to psychological need satisfaction based on literature across domains (i.e. health, psychology, coaching, education). These factors were synthesized and then re-contextualized for the technology domain.

The guidelines are presented as a hierarchical framework with three levels. The highest level is denoted by three principles of wellbeing supportive design corresponding to psychological needs i.e., technology should support user autonomy, competence, and relatedness. The second level subordinate to these principles are heuristics, or practical rules of thumb for technology design. For example, a heuristic that sits within the principle of supporting user autonomy is 'apply best practice for accessibility.' The framework presents 18 heuristics corresponding to the three overarching design principles. The third level, subordinate to heuristics, is 'strategies.' Strategies are specific implementation actions corresponding to each heuristic. For example, a strategy sitting within the heuristic 'provide meaningful choices' is 'offer customizable profiles.'

We have taken these guidelines and adapted them for the specific context of online health forums by integrating the perspectives of a range of stakeholders with experience and expertise in this domain. It is hoped that by offering both practical strategies and overarching design principles informed by psychological theory, forum designers and hosts across health settings will be able derive insights applicable to their diverse contexts.

Methods

This paper is one element of the improving peer online forums project (iPOF) led by Lancaster University and hosted by Berkshire Healthcare National Health Service Foundation Trust [23]. The interdisciplinary iPOF research team includes academics working across psychology, linguistics, computer science, health economics, lived experience experts, forum staff, and clinicians with

experience designing, implementing, and evaluating online health forums. A detailed description of the project is available in a published research protocol [23]. Ethical approval for this research was granted by Solihull Research Ethics Committee (IRAS 314029). The wider project team includes several partner forums with representatives from statutory, corporate, and charity health services. While the iPOF team has a primary area of expertise around mental health, the study's partner organizations host health forums on a range of issues including physical health, young people's wellbeing, and carer support. A deidentified description of the partner organization's forums is on the study website [24]. We used a primarily qualitative approach, drawing on the expertise of our research team, forum staff, and forum users at several stages:

Stage 1: Data collection

We collected qualitative data regarding the design of health forums using semi-structured interviews and workshops, conducted between August 2023 and October 2024. First, individual interviews were conducted with forum hosts (n=18) working at the project's partner forums. Participants included moderators and supervisors working at organizations running health forums, in addition to academics within the iPOF team who had experience designing and evaluating health forums. A second round of interviews (n=36) was conducted with users of our partners' forums. Interviews were conducted either by PM or ZG via phone or Microsoft Teams, audio-recorded, and manually transcribed by a professional transcription service for analysis in NVivo 12. Consistent with the wider aims of the iPOF study, these interviews sought to understand the underlying mechanisms explaining how forums work, with specific focus on the impacts on forum users and moderators [6,7]. Questions therefore focused on understanding why specific aspects of forum use contributed to intended and unintended impacts. All participants were asked to describe the features of their forum, advantages, and challenges related to the way in which their forums were designed, and areas for improvement (e.g. 'what are the features of the forum?', 'What do you like and what could change?', 'What advice would you give to forum designers?'). Results regarding forum impacts are reported elsewhere [6,7]. We conducted a secondary analysis of these interview data for this study, focused solely on insights relevant to forum design.

We subsequently held four two-hour design workshops with forum hosts using Microsoft Teams. Workshops were facilitated by the research team (PM and FL) and attended by senior staff or moderators from partner forums. Three workshops separately explored the psychological needs for autonomy (number of attendees= 4), competence (n= 5), and relatedness (n= 10). We held an additional workshop focused on designing forums to promote safety (n= 8), which emerged as a priority area for designers, staff, and users in our team's prior work [6]. Researchers facilitating these workshops first introduced each concept and its relation to forum design in a short presentation, before inviting attendees to share ideas for how forums could be designed to enhance wellbeing via each concept, i.e., 'how can forums be designed to promote user autonomy?.' Researchers captured participants' ideas using detailed field notes, which were added to NVivo 12 for analysis alongside interview data. Interview topic guides, and interview and workshop participant demographic details, are available in multimedia appendix 1.

Stage 2: Coding a draft framework

Data analysis was informed by the principles of qualitative framework synthesis [25]. We used Peters' research-informed guidelines for wellbeing supportive design as the starting point for the analysis [18]. As described above, the guidelines are presented as a hierarchical framework with three levels of granularity: Principles, heuristics and strategies.

At the outset of the analysis, we replicated Peters' framework in NVivo 12, with each principle, heuristic, and strategy represented as a node to which interview and workshop data could be coded. As per our prior work which highlighted the central importance of harm reduction and psychological

safety in the delivery of health forums [6], we added a principle corresponding to the need for safety. PM and ZG conducted initial data analysis using a combination of deductive and inductive coding. Our goal was to populate the framework with content specifically related to online health forums. Deductive coding involved linking data extracts to pre-existing strategies and heuristics. Where data did not relate to an aspect of the framework, they were coded inductively and grouped to create new heuristics and strategies. Twelve of the original 15 heuristics were retained, with strategies modified to reflect forum design preferences described by participants in our workshops and interviews. However, as Peters notes “some will apply more readily than others for a given technology or project.” [18] Indeed, three heuristics not supported by our data were removed at the end of the coding process, specifically:

- ‘Support optimal challenge’ - especially relevant for games or technologies with advanced users but not to health forums.
- ‘Provide non-evaluative feedback’ - especially relevant for users of education and behavior change technologies, performance feedback is not a feature of health forums.
- ‘Provide effectance-relevant feedback’ - as above, performance feedback is typically not given to health forum forums.

While heuristics are designed to be broadly applicable, Peters also provides context-specific strategies to illustrate how each heuristic can play out in practice with strategies provided for specific contexts including games, education and behavior change. We have drawn on these to provide strategies with our framework but adapted or replaced them as needed to tailor them to the online forum context. It should be noted that implementation decisions may promote multiple psychological needs simultaneously. For example, a well-moderated forum is likely to feel safer, lead to more goal-oriented use, and facilitate positive relationships. In the interest of clarity and to reduce repetition, we have presented heuristics and strategies under the psychological need they most directly support.

Stage 3: Refinement through stakeholder engagement

The draft framework was shared with and refined in response to written feedback from those who had participated in the host workshops and the wider iPOF team, including co-authors with personal experience of designing, moderating, using and evaluating online mental health forums.

Results

The resulting framework for the design of health forums comprises four principles framed around designing for autonomy, competence, relatedness, and safety. These principles are reported alongside 18 corresponding heuristics, each with specific implementation strategies. Principles and heuristics are presented in Table 1. Specific strategies are described in the text below.

Table 1: Guidance for well-being supportive design adapted for online health forums

Principle 1: Support autonomy	
ways	Heuristic 1: Apply best practice for accessibility
	Heuristic 2: Empathize with your user’s frame of reference
	Heuristic 3: Provide meaningful rationale
	Heuristic 4: Provide meaningful choices
	Heuristic 5: Support informed choices
	Heuristic 6: Communicate in autonomy supportive rather than controlling
	Heuristic 7: Ensure rewards are autonomy supportive
	Heuristic 8: Support mindful attention

Principle 2: Support competence

Heuristic 9: Apply best practices for usability

Heuristic 10: Communicate guidelines and protocols

Principle 3: Support relatedness

Heuristic 11: Support a sense of meaningful connection to others

Heuristic 12: Support a sense of belonging

 Heuristic 13: Support caring for others

Principle 4: Support safety

Heuristic 14: Establish community guidelines
Heuristic 15: Establish procedures for managing distress
Heuristic 16: Consider the limits and impacts of anonymity and confidentiality
Heuristic 17: Manage content visibility
Heuristic 18: Establish procedures for managing problematic forum
use

Heuristics in bold represent those added to the original guidance framework for wellbeing-supportive technology design [18]. Un-bolded heuristics represent those retained from the original framework. Context-specific strategies have been tailored for online health forums

Principle 1: Support autonomy

The psychological need for autonomy refers to the need to feel volitional self-endorsement of one's own actions [26]. As noted by Peters [18], in the context of technology use, autonomy is supported when users have ready access to, and are well informed about the technology at hand. This should allow users to make informed and meaningful decisions about how they engage with it in ways that are consistent with their personal goals and values. The heuristics and strategies presented in this section therefore focus on how forum designers can foster informed, transparent, and purposeful engagement within online communities.

Heuristic 1: Apply best practice for accessibility

Ensure that online health forums are accessible by accounting for the different support needs and access formats of the potential user-base.

Strategy 1.1: Conduct accessibility testing with diverse users and formats

Health forums are accessed by people with a range of differing cognitive and physical abilities. In addition, they are likely to be accessed with various devices, including desktop computers, laptops, mobile phones, and tablets and with different operating systems. Ensure that forum topics can be navigated intuitively on each device and by diverse users. Particular attention should be paid to the appearance of the forum on mobile web browsers, which may be more difficult to navigate given the small size of these devices. Within threads, posts should be ordered clearly and sequentially so that there is an easy-to-follow flow to online conversations. Integration with supportive technologies for use by those with additional access needs, such as screen readers, should be considered and are likely to depend on users' specific devices. See Web Content Accessibility Guidelines 2.2 for details on developing accessible digital services [27].

Heuristic 2: Empathize with your user's frame of reference

Eliciting users' perspectives on their goals for forum use is likely to support service development aligned to users' preferences, increasing the likelihood that the service is endorsed by community members. Do so in a way that expresses a genuine desire to understand, learn, and act on their views.

Strategy 2.1: Utilize co-design methods

Co-design refers to service development by multiple stakeholders, most often health service staff or researchers and those with lived experience of health conditions. There is a growing body of work detailing how to conduct meaningful and genuinely collaborative co-design [28], including for digital health services [29–31]. In the context of online forums, designers may wish to conduct co-design for entire forum-based services, for example in the context of intervention design research, or on specific aspects of forum services, such as proposed updates or new features. Seeking diversity in user perspectives, including less frequent users and those with different backgrounds and experiences, is likely to promote forum accessibility amongst a wider audience of potential users. Such work should be appropriately resourced to allow for content to be regularly reviewed and refreshed as the community evolves.

Strategy 2.2: Seek community perspectives

Include a way for users to provide ongoing feedback on their forum experience. Options include a 'report a bug' function, a specific 'feedback' thread to which users can post about challenges or suggestions for updates, community polls or surveys, and via establishing a user advisory group. Consider using surveys to improve the representativeness and diversity of data on user perspectives. This can complement co-design methods, which are usually conducted with smaller groups and are more resource intensive. Surveys can be targeted for specific purposes, such as gaining perspectives on new forum features at the design phase, or feedback on recent changes. Forums should aim for an iterative and inclusive dialogue with forum users to shape the community in their interests [32]. A co-developed theory of change identifying the way in which a forum is intended to operate can further guide data collection, identify areas for intervention optimization, and highlight both expected and unintended impacts.

It is important to note that users are more likely to feel that their input has been heard, valued, and acted upon if the forum host provides acknowledgement of their suggestions and evidence of their implementation in forum design. Conversely, collecting feedback without affecting change may lead to frustration that users' voices have not been adequately recognized.

Heuristic 3: Provide meaningful rationale

To promote willing endorsement in user experience, explain why forums function as they do. Make rationales meaningful by using accessible language and include details relevant to the user experience, avoiding unnecessarily technical or abstract information.

Strategy 3.1: Articulate reasons for forum functions and limitations

Providing clear, accessible information regarding the scope and function of a forum can promote informed engagement and mitigate against users feeling frustrated if they later find that the forum does not operate as expected. Such content could include details regarding the intended function of the forum and what the forum is not equipped to deliver, for example, clarifying that the forum is meant for peer support and not medical advice, if appropriate. This could include outlining to users

the reason for any limits on what can be shared in a visible place within the forum, such as a sidebar, a post pinned to the top of the main page, or via an automatic response to their initial forum posts. Clearly articulating the rationale for any boundaries on forum use can avoid users becoming dissatisfied or disengaged when rules related to such topics are enforced.

Heuristic 4: Provide meaningful choices

Provide options for modifying the forum experience in line with users' goals and values.

Strategy 4.1: Provide personalization options

Include personalization options likely to be valued by forum users. This could include the use of customizable profile pictures or virtual avatars, profile pages with space to include a user biography, or an editable signature that appears underneath users' forum posts. This could serve to humanize users' profiles and offer a point of connection with peers. Designers should ensure that such options are both appropriate for the intended demographic and are limited, where necessary, in the interests of user anonymity and confidentiality.

Strategy 4.2: Provide supplementary health information

Many users initially access forums with the aim of learning more about a personal health issue or where to find further support. To support this goal, consider providing up-to-date health related information or signposting to other credible organizations. This is particularly valuable when articulating service boundaries. For example, if a forum states that it does not allow discussion of suicidal experiences, provide links to an alternative service to avoid users feeling dismissed without support.

Heuristic 5: Support informed choices

Provide sufficient details regarding how forums operate to allow users to make informed decisions about participation and disclosure.

Strategy 5.1: Set expectations for forum use

To support informed participation, provide information regarding what the forum intends to offer. This could include setting expectations around the type of support available and the nature of forum interactions, who the community is populated by, and the role and responsibility of forum moderators. Forums may wish to set expectations for users' behaviour on joining the forum by clearly articulating how they should interact with other users. A range of options are available for presenting this information, including as part of an initial user agreement, sign-up email, on the forum landing page, or via the use of pop ups (bearing in mind that some people block pop-ups). A particular challenge users face is uncertainty regarding if and when they may receive a response to their forum posts or messages to moderators. If possible given forum resources, setting an expectation for when this may occur can be valuable (e.g., 'we try to respond within 24 hours').

Strategy 5.2: Be clear on data sharing

The ways in which forums use personal information (and why), including data privacy and confidentiality (who will see their posts and what protections users can expect), should be explicitly articulated to allow users to make informed choices regarding what they share. Users may be asked to consent to their information being processed at sign-up, where, for example, it is used for research or marketing purposes. It should be clear to forum users who exactly will see their personal information and forum posts, and the implications this has for the privacy of their data. This is likely

to vary depending on whether the forum is publicly available or private. Forum designers should account for legal requirements pertaining to the region from which users access forums to ensure compliance, such as the European General Data Protection Regulation [33]. If the host organization intends to conduct research with forum data, users should be given the option to freely provide or withhold consent (i.e., they should still be able to use the forum if they decide against) for their data to be used for research when they sign up to the forum.

Heuristic 6: Communicate in autonomy-supportive rather than controlling ways

Autonomy-supportive communication is a communication style that supports self-endorsed action. Its core characteristics include recognizing others' perspectives, supporting choice and internal motivation, and avoiding coercive statements (for example, saying "you might want to consider" rather than "you must" to preface recommendations). Research suggests that in health contexts, autonomy-supportive communication that facilitates informed choices, is respectful, and avoids judgment, promotes greater decision satisfaction and adherence amongst service users [34]. In interactions with forum users, forum hosts should use language that supports self-endorsed action and limit directive language to only those situations where it is necessary to maintain a safe and supportive community culture. Features that scaffold this type of language use could be included in the moderator side of the forum interface, for example as starter templates which model language use, or tips.

Strategy 6.1: Balance supportive and directive moderation

Some forums may require posts to be edited or removed if they infringe on community rules or guidelines. The way in which these guidelines are implemented can influence the extent to which users feel their autonomy is being infringed. Deleting posts without adequate explanation or guidance on how to post appropriately can lead to frustration and undermine rapport between users and forum staff. Moderators should attempt to communicate in a collaborative rather than admonishing tone, where possible. For example, for minor guideline violations such as posting in the wrong sub-forum, moderators could explain the correct way to use the forum and move the post to the correct section of the website.

If available and appropriate, moderators may make use of private messaging for more extensive discussions of forum use to avoid causing the user public embarrassment, though this should be balanced against the benefit of posting such messages to an open forum and thus promoting awareness of community guidelines to the wider group. Some forums use a '3-strikes' policy for minor, non-safety related rule violations before restricting a user's account access to shift responsibility for acting in accordance with forum rules back with the user, promoting autonomy and providing the opportunity to learn how to use the forum appropriately. However, it is important that when users act in a way that renders the community unsafe, moderators should act quickly, decisively, and consistently, communicating to forum members more broadly that the community is a well-managed space.

Strategy 6.2: Provide control over notifications

By providing control over notifications, users can manage the degree to which they are prompted to engage in forum conversations. This is appropriate given some users may find continuous and repeated exposure to forum notifications irritating or overwhelming, especially as health forums can entail emotionally charged content. However, some users also report challenges with keeping track of conversations and losing threads they had previously found helpful. Providing the option to bookmark or save interesting threads allows users to quickly find relevant information. Similarly, the ability to opt-in to notifications, pop-ups, and e-mails about new content, such as responses to a user's post, can promote ease-of-use and ongoing engagement.

Heuristic 7: Ensure rewards are autonomy supportive

Provide rewards that function as feedback on desired community behaviour. Where such rewards are implemented, carefully consider the potential for negative consequences, such as providing an incentive for unethical behaviour to 'game the system' [21].

Strategy 7.4: Reinforce peer support

Consider mechanisms for providing rewards to those who engage in peer support. Some forums do this through functions such as the ability to send virtual hugs, likes, or presents, or they include ways to react to comments using a system that allocates other virtual rewards, such as points, to helpful comments. This could be done on a more informal basis by moderators whose activities could include proactively seeking out and thanking users for particularly helpful replies to users seeking support, thus modelling the desired communication style and community culture.

Strategy 7.5: Recognize community contributors

Forums may include some method of recognition for positive community contributions, such as helpful comments, the sharing of useful information, or resources such as relevant articles. These include badges that recognize rewards for 'top poster' or 'post of the month.' Likewise, forum moderators, many of whom work on a volunteer basis, will benefit from recognition of the important work they do. While rewards like badges may be appreciated, these should be co-designed with community members and caution must be exercised with regard to what is being rewarded (quantity, frequency, and impact) to ensure moderator's and user's authentic and autonomous motivations to help others are not hijacked by extrinsic rewards based on quantifying what is a complex human activity.

Heuristic 8: Support mindful attention

Design forums to facilitate sustained attention on core forum content. In recognition of the challenges of reading about and discussing potentially personal and sensitive health issues, consider prompting awareness and self-reflection on how users are experiencing the forum.

Strategy 8.1 Minimize distraction

Design forums to support sustained attention on key forum tasks, including reading forum conversations and writing posts. This can be achieved by presenting written information in simple, well-organized formats with minimal visual clutter and sufficient white space. Promote autonomy over interruptions to user experience, such as notifications or pop-ups, by providing options to customize or remove them. Minimizing distraction is not only important considering the emotionally

sensitive nature of forum discussion but also considering that users will be approaching health forums with diverse cognitive symptoms and abilities (e.g. as a result of chronic pain, brain fog, injury or neurodiversity).

Strategy 8.2 Prompt self-awareness

Prompting self-awareness of current thoughts and emotions may assist users with engaging with the forum in a way that supports their wellbeing. For example, some forums provide the option of completing a short-written reflection at log-in, in response to questions such as “how are you feeling right now?” Other forums may achieve a similar effect with regularly scheduled discussions, such as ‘check-in’ threads, where users discuss how they are feeling. Forums may also consider ways to prompt self-awareness regarding potential negative impacts of forum use, such as distress arising from reading about others’ challenging experiences followed by recommendations for support or signposting. For example, guidance information, reinforced by comments from moderators, could remind users to remain vigilant to the challenges of discussing health issues online and take breaks where necessary. Some forums have recognized the value of self-reflection through exploratory writing about personal health by including features such as a diary space, where users are able to write freely without the content being accessed by other users. A private journaling space also provides an alternative for users to express themselves in relation to topics that may not be permitted for discussion on the forum.

Principle 2: Support competence

The psychological need for competence relates to one’s feeling of being capable and effective, and is similar to notions of self-efficacy. Conversely, when competence is frustrated one feels a sense of failure or helplessness [26]. Forum hosts should therefore seek to promote a sense of personal effectance and mastery over forum use, and avoid design that is experienced as difficult to understand and use. This section includes heuristics and strategies to promote competence in forum use. Designers should also consult relevant technology usability guidance [35].

Heuristic 9: Apply best practices for usability

Follow established usability guidelines and best practices to ensure functionality and ease-of-use.

Strategy 9.1: Make forum use convenient, efficient and simple to understand

Designers should aim to promote convenience in forum experience and reduce barriers between users and desired actions. This could include making the sign-up process simple and efficient by reducing the number of steps involved, and requesting only essential information from prospective users. Designers may also wish to consider features such as automatic login to facilitate rapid forum access, optional notifications related to relevant forum activity such as responses to their posts, and an effective search function to allow users to quickly navigate the wealth of information likely to be contained within existing threads.

Strategy 9.2: Provide cross-device access

Many users will access forums in a similar fashion to social media. That is, they will access forums periodically, checking for new content or responding to recent messages, perhaps while logged in with several different devices simultaneously. Providing streamlined access to multiple devices people already use regularly is therefore likely to promote engagement.

Heuristic 10: Communicate guidelines and protocols

Provide guidance on how to use the system and on any policies or protocols that determine how users are expected to interact.

Strategy 10.1: Provide detailed guidance on forum use

Support user competence by providing clear and engaging guidance on how they can use the platform effectively, for example as part of initial onboarding, as tips and/or under a help menu. This is particularly valuable for new users, who, on entering the forum, are likely to be frustrated if it appears unnecessarily complex and difficult to navigate. Topics forum designers may wish to cover include:

- Core functions including how to navigate the forum, start threads, post responses, and use other features such as private messaging, where available
- Community rules, such as restricted topics, as well as actions moderators may take if rules are broken
- How to engage in supportive communication with other users. This may include how to request additional support from moderators if a user is concerned about content they read on the platform
- Details on the confidentiality of users' information and the implications of anonymity for forum use, if applicable

Strategy 10.2: Promote guidance visibility

Information regarding how a service operates, such as its terms and conditions, is not routinely read by many internet users. Designers should therefore consider how to promote engagement with forum guidance. This may include a series of short, engaging animations or videos that new users must click through before accessing the forum; a 'community hub' or 'how-to' section containing accessible information on how the forum works; or a pop-up that details forum rules and an agreement to abide by them, before users are able to post their first message to the forum.

Principle 3: Support relatedness

Forums are well positioned to support the psychological need for relatedness, which encompasses the "experience of warmth, bonding, and care and is satisfied when one feels connected to significant others". [26]. Research in peer support more broadly indicates that support for the psychological need for relatedness can emerge from the reciprocal and mutually beneficial exchange of health experiences and social support [36]. This section includes heuristics and strategies relevant to promoting opportunities for connection.

Heuristic 11: Support a sense of meaningful connection to others

Support experiences of warm connection and closeness to others.

Strategy 11.1: Make community activity salient

Individuals with health difficulties often feel alone in their struggles, so providing cues that signal belonging to a larger community can help. Relatedly, forums require an active community to generate new content and maintain momentum. Therefore, to promote the feeling that users are engaging with others in an active community, forums could show the number of users online or active in the forum, or other forum activity such as recent posts. Forum profiles could also show

whether a user is online and active, or when they last posted, which may encourage others to engage in conversation. Any signal revealing user status should be customizable (i.e. users may not want to signal their active status and should have the choice). Where it is not appropriate to show live users (e.g. the community is small, technical limitations), other low-tech and static representations of community members can also serve this function (e.g. collections of anonymized avatars, featured member profiles or stories, a world map marked with points showing where different members are from, etc.).

Strategy 11.2: Consider synchronous communication options

Supplementary, synchronous communication features can provide the opportunity for direct engagement with others, supporting a sense of communal presence and interactivity. Examples include pre-scheduled 'chats' or 'question and answer' sessions hosted by forum staff using live chat or video streaming software. Such events could be themed around topics chosen by the community, such as symptom management, to promote engagement and peer interaction. Some forums also provide users with the ability to interact with staff and other users via instantaneous direct messaging, creating a space for private conversations. Designers should, however, consider potential challenges associated with direct messaging such as privacy issues, service misuse, and increased demand on moderators.

Strategy 11.3: Support meaningful moderator interactions

Forming meaningful connections and helping others within a forum environment involves communicating in ways that are welcoming, express empathy, and provide relevant information and advice where necessary. However, showing understanding and providing emotional support by text is a highly skilled task. Supporting moderators in learning and exercising these skills can help support this connection-making. This can form part of moderator training and support, and scaffolding can also be built into the system, for example through the provision of templates, examples or tips. To further enhance peer engagement, some forums employ staff or volunteers with lived experience in 'supporter' roles, whose responsibilities may have less of a focus on rule enforcement but rather on interacting with forum users, generating opportunities for meaningful connection.

Strategy 11.4: Optimize experiential groupings

Health forums usually group users by a shared personal experience of a particular health condition, which is intended to engender a sense of community by facilitating the sharing of relatable lived experiences. Designers should consider how the experiential grouping around which communities are formed may impact perceived relatedness. Existing forums differ on this issue. For example, it is feasible that a mental health support platform for young people which includes both those in their early teenage years and young adults may lead to relatedness frustration, if one particular age group predominates and users in the minority are unable to relate to the challenges expressed by a majority of forum users. Other forums use intentionally broad inclusion criteria, bringing together people from different ages and backgrounds, to ensure forums are well populated and include diverse experiences across the trajectory of a specific health condition. It is therefore important to work with users and moderators to refine this decision in light of the intended function and scope of the specific service goal. Sub-forums can also be used to funnel users to those with shared experiences, such as a section specifically for those with certain diagnoses, or families and carers of people with a particular health issue.

Strategy 11.5: Consider non-textual interaction options

Some users report the benefits of using non-textual interaction options such as emojis, images or gifs. These features can help communicate emotions and are particularly valued by those who use

them frequently in non-forum contexts. Other features, such as the ability to ‘like’ a comment, provide an easy way for users to indicate that another’s post has been helpful. Views on these features are mixed, with some valuing their inclusion in forums, and others noting that they detract from the intended text-based nature of communication. Work with your users to determine the best approach for your context and consider allowing users to disable images (especially moving imagery like animated gifs) if these are permitted.

Strategy 11.6: Consider ‘off-topic’ threads

Some forums include ‘off-topic’ discussions not explicitly related to health issues, such as general interests or hobbies. These threads can be popular and provide a place for relationships to develop. Such threads should, however, align with the wider aims of the service and may not be appropriate for all forum contexts.

Heuristic 12: Support a sense of belonging

Consider how forums can communicate the sense that forum users are both welcome in the community and part of a shared space with likeminded individuals.

Strategy 12.1: Make community membership salient

Promote a sense of belonging by emphasizing that users are members of the online community. This could be by referring to the service as a community with members, rather than a forum with users. Other ways to instill a sense of participation in and ownership of the community could be to provide opportunities for users to shape forum content, for example, by selecting themed content or inviting users to provide feedback on the way the community is run or even be invited to participate in design sessions to determine how elements of the forum interface should be crafted (e.g. the use of like buttons, emoji, profile images, etc.).

Strategy 12.2: Encourage engagement by new users

The initial experience of a forum is crucial and often informs whether a user continues engaging or leaves the community entirely. Some forums have dedicated spaces for new users to introduce themselves and initiate peer interactions. Some also have dedicated ‘welcomers,’ who are moderators or members of the community assigned the responsibility of acknowledging and inducting new users. The intention here is to ensure users have a friendly, welcoming, and rapid initial interaction which promotes a positive impression of the forum, increasing the likelihood of ongoing use.

Heuristic 13: Support caring for others

Design forums to provide opportunities for mutual support and reinforce caring behaviors.

Strategy 13.1: Encourage supportive contributions

Forum designers should consider how to encourage a positive culture of supportive communication based on the values underpinning their service. These may include a desire for an inclusive, welcoming, and supportive space free from stigmatizing perspectives or online toxicity. Practical steps towards such a culture include clear guidance on sign-up encouraging users to share their views, support others, and note when they have found another user’s post helpful. These behaviors

can also be modeled and reinforced by moderators, whose style of communication sets the tone for the wider community. Equally, discouraging disagreeable, harsh, and unfriendly responses is likely to contribute to a supportive forum culture. Some forums seek to generate supportive communications with sub-sections or threads themed around requests for support, such as ‘I need help with...’ threads. Consider ways to show or give care in virtual form, such as alternatives to the “like” button now offered by services like LinkedIn, which may include, for example, a hand holding a heart, the ‘recovery’ emoji (a heart wrapped in a bandage) or the hug emoji -- all of which are commonly used for showing sympathy.

It is well established that the majority of online forum users observe rather than contribute to conversations. This may be because of difficulties with communicating online, including expressing feelings. Consider materials such as articles or accessible online learning resources like short animations, focused on supporting users with knowing how to frame their experiences or to write supportive posts to others.

Strategy 13.2: Make positive impact salient

As Peters’ notes [18], receiving evidence that one’s behaviour has positively influenced others can promote relatedness, while also promoting autonomy and competence. Perhaps the most powerful reward or acknowledgement for a moderator’s efforts (or the efforts of community members trying to help others) is evidence of their own impact. Any evidence that their conversation made a difference in someone’s life can be a deeply meaningful reward for anyone functioning in a helper role and such evidence can help support resilience over burnout [37]. Forums may therefore seek to include mechanisms for convenient expressions of gratitude, such as a mechanism to ‘heart’ another user’s comment or mark it with “thanks,” “this really helped” or “I appreciate this”. Moderators could also be guided to proactively respond to users directly, expressing appreciation for their positive contributions to forum conversations. For moderators, specifically, providing aggregated data about how many users viewed their responses or clicked on links that they provided (e.g. as part of recommending resources or signposting) could be a powerful way to show impact.

Principle 4: Support safety

User safety is a primary concern for health services, aligning with the principle that interventions should first do no harm. The inclusion of the principle to support user safety is grounded in the assumption that users who perceive a forum to be a supportive and well managed place, where rule breaking and distressing content is minimized, will be more likely to read and post to the forum [6]. It should be noted that forum safety not only relates to the minimization of harm, but also on psychological safety, or the perception by forum members that the community is a place in which they feel able to share what are often very personal health experiences, with the confidence that responses will be respectful and constructive.

Heuristic 14: Establish community guidelines

Establish clear rules designed to promote peer support and discourage behaviors likely to undermine wellbeing.

Strategy 14.1: Balance openness and risk

Rules should facilitate supportive and open discussion of health-related issues yet restrict topics likely to cause harm to the community. The challenge for designers lies in disallowing content that could reasonably be expected to cause psychological distress or lead to physical harm to those who

read forum discussions, while avoiding the space becoming overly sanitized such that frank discussions of health experiences cannot occur. Considerations for health forums include the extent to which users are permitted to discuss sensitive topics such as suicidal experiences and self-harm, experiences related to eating behaviors, advice giving regarding medical treatments, and misinformation. To retain focus on health, some forums may restrict debate on potentially controversial topics, such as topical social issues or politics. Such rules should be carefully considered with reference to the focus and demographics of the forum, and designers may wish to work with users and/or experts by experience in the health issues the forum is intended for to promote the acceptability of community guidelines.

Strategy 14.2: Implement timely rule enforcement

Minimizing risk of distress related to forum content relies on its timely recognition and removal. It may be that forum moderators are recruited to work in shifts to ensure that there is always someone available to manage safety issues as they emerge. If this is not possible, to support informed forum use, users should be notified if moderation is limited to specific hours. Some forums implement pre-moderation, where forum posts are manually reviewed by content moderators prior to their going live on the forum. This thorough approach significantly reduces the risk of inappropriate content on the forum, but also the degree of synchronicity in user-to-user interaction and requires significant resources. Important considerations regarding timely moderation include daily and seasonal changes in the volume of forum posts (e.g. increases in forum use during periods when people may be more likely to seek support, such as exam periods or public holidays) and the moderation team's capacity to deal with spikes in workload. Moderation teams should be appropriately resourced to meet such demands to ensure continuity of service and reduce the risk of staff burnout.

Strategy 14.3: Use technology to facilitate moderation

Evolving technical approaches allow the automated detection of problematic posts or the triaging of posts for moderation, showing the potential for technical systems to support moderators and reduce workload [38]. Features that support forum moderation include automatic word blocking programmes to identify and remove posts that include prohibited words. These systems are often trained with a bank of posts tagged by human moderators. Other automated approaches involve triage, for example, systems that highlight posts based on content (e.g. suicide ideation) or time (posts that have not received a reply within a particular timeframe) allowing moderators to efficiently respond to those most urgently requiring support. Moreover, some forum environments allow users to flag problematic content themselves. The inclusion of a user-report system, where users inform the moderation team of any issues on the forum, is likely to support the efficient identification and management of rule-breaking or concerning content. While using technology such as artificial intelligence and automation holds promise for streamlining content moderation, forum hosts should be mindful of the complexity of recognizing when forum rules may be broken or where users may express issues requiring more focused support. Any such system should be rigorously tested to avoid unintended outcomes.

Heuristic 15: Establish procedures for managing distress

Discussions of health-related issues hold inherent potential to cause distress to those sharing and reading about these experiences. Designers should consider how to manage distress within the constraints of the online forum context.

Strategy 15.1: Use a stepped approach to managing distress

A stepped or graded approach to user support is valuable for forum staff because it defines various

degrees of user distress and corresponding guidance on how to respond. An example of a stepped approach is one that defines 'low', 'medium' and 'high' levels of concern regarding a user's wellbeing. A low concern situation may warrant an empathetic response by a moderator in a forum thread where a user reports feeling upset. A medium concern may be characterized by more severe expressions of distress, in response to which the moderation team may offer more focused support for example through direct message or signposting to other relevant support. A high degree of concern may relate to situations in which users express feeling unable to keep themselves safe, and forum staff may therefore implement a specific protocol for managing risk-related situations. Such a protocol is likely to vary by context and available resources (e.g. providing a link to a suicide hotline, offering a call from a mental health emergency professional) and will be influenced by factors such as the duty of care an organization holds over forum users and the amount of information the organization has about each user. It is important for both moderator and user safety that such protocols are clearly defined and reviewed regularly.

Strategy 15.2: Provide comprehensive moderator support

Moderators engage in skilled and often demanding roles which can include providing support to people struggling with severe health challenges, and reading large volumes of potentially highly distressing forum posts. Their work is essential to maintaining the safety and effectiveness of health forums. Designers should therefore consider how to ensure forum moderators feel confident in their roles and can be protected from distress, including feeling overwhelmed by unmanageable workloads. Strategies to consider include both initial and ongoing training in the forum's subject matter and in providing support to forum users; supervision from experienced colleagues to discuss challenges and personal wellbeing; peer-to-peer support between moderators, which is particularly valued during shifts to facilitate shared decision making; and post-shift debriefing [7]. It is important that volunteer moderators are not limited in accessing appropriate support services due to their role as unpaid staff. Finally, as mentioned above in strategy 13.2, providing moderators with evidence of the positive impact they have can also contribute to their motivation and wellbeing.

Heuristic 16: Consider the limits and impacts of anonymity and confidentiality

The degree to which users are able to remain anonymous, and how confidential their personal information, constitute important implementation decisions for forum designers. These factors may influence users' willingness to engage with the forum and the extent to which safeguarding concerns can be managed.

Strategy 16.1: Balance anonymity and confidentiality with safeguarding responsibilities

Forum designers must decide how much personal information to gather from their users. Some forums require only an email, while others request more extensive personal information about demographics and location. This will influence the ability of forum staff to respond to safeguarding concerns. For example, if a user appears at risk of harm, it may be impossible for forum staff to identify that person or their location if only minimal details about them are collected. While collecting personal information may mitigate this challenge, many forum users register for forums precisely because they can be anonymous, and their posts are untraceable back to their offline identity. This allows them to speak more freely, without fear of being judged or receiving unwanted offline input. Indeed, 59% of 507 participants surveyed as part of the iPOF study reported feeling

safe to post online due to anonymity [39], and research on anonymity on Reddit forums found anonymity led to feedback that was more involved and emotionally engaging [40]. Forum designers should consider how to balance the advantages and possible disadvantages of user anonymity, bearing in mind their organizational responsibility to protect forum users from harm. If forums do hold confidential personal information, conditions under which those details will be shared, for example with emergency services, should be made explicit.

Heuristic 17: Manage content visibility

Consider how forums can be designed to provide control over which content users see. This can help to promote informed choices around exposure to issues users may find distressing.

Strategy 17.1: Content structure, tags, and warnings

Forums can be designed to help users understand whether forum content may be distressing before they access it. This could be achieved via sub-forums, with dedicated areas for discussing more potentially distressing topics. Some forums also implement content warnings or topic tags, which inform users of the likely distressing nature of the thread before they click on it. Similarly, within threads, some forums have a 'spoiler' function. This blanks out some or part of a user's post and requires a reader to manually click to reveal the text.

Heuristic 18: Establish procedures for managing problematic forum use

Anticipate and plan to address problematic behaviors that could undermine the safety and effectiveness of online health forums.

Strategy 18.1: Develop protocols for addressing forum-specific problematic behaviour

Developing plans for managing specific problematic behaviors common to online forums will help forum staff to identify and deal with issues effectively. Behaviors that designers should consider include:

- **Trolling** - users engaging in intentionally offensive or provocative behaviour such as posting inappropriate content or instigating inflammatory discussions
- **Inappropriate interactions** – users engaging in forum use that is incongruent with the forums aims and rules e.g., starting conversations not relevant to the forum or using private messaging to request personal information
- **Arguments** – users engaging in discussions that go beyond mere disagreement to personal insult or threats. Rules that clearly articulate the line between disagreement and rule-breaking disputes help inform both users and moderators about what is acceptable.
- **Multiple account creation** – users who have had their accounts restricted creating further accounts to continue with their problematic behaviour
- **Spam** – irrelevant or inappropriate content usually intended to disrupt the forum's function

Discussion

Overview of principle findings

This article reports an adaptation of SDT-informed technology design guidance [21] for the context of online health forums. SDT is a major theory of wellbeing and designing to support basic

psychological needs has been put forward as an approach to avoiding harm in technology environments [16]. Drawing on an existing set of wellbeing supportive design guidelines, we present heuristics in support of autonomy along with a range of strategies for promoting forum design and delivery in ways that align with users' self-endorsed behaviour, goals and values, with a particular focus on user involvement and forum transparency. Competence-supportive heuristics were modified to account for the importance of creating an easy-to-use and understand forum experience. For supporting relatedness, a key concern for forum designers, we adapted heuristics to focus on how forum users (including moderators) can be encouraged to engage in meaningful, and supportive interactions. Finally, a set of novel heuristics focusing on safety in online health forums was added to the set and detail essential issues forum designers should consider when defining key functions, including moderation, forum rules, and the management of user distress.

Integration with existing literature

This article outlines a series of principles, heuristics, and strategies that are applicable across a wide range of forum settings. However, their implementation will require adaptation to the specific context in which a particular forum operates. Case studies from the seven UK mental health forums in the broader iPOF project illustrate how forums adopt diverse approaches to moderation, rule enforcement, safeguarding, and site functionality, providing examples of how some of the design decisions reported here are implemented within different contexts [24]. Implementation will also depend on factors including the impacts forum hosts aim to generate, characteristics of the expected-user base, the nature of the organizational context, and resources available for moderation. Results here highlight that no one approach is applicable across contexts and hosts should weigh both the advantages and potential drawbacks of each design decision (ideally in collaboration with their users, i.e. experts by experience).

Prior research has emphasized the challenge of balancing conversational openness with the need to regulate discussions in health-related forums [6]. This balance is crucial to avoid creating either a space that is overly sanitized or one that resembles the 'wild west' of unmoderated online environments. Illustrating this challenge, a forum designed to support young people experiencing suicidal ideation implemented robust safety measures, including collecting personal information for emergency contact and automatically blocking suicide-related conversations [41]. Highlighting the complexity of forum implementation, some users appreciated these precautions for the reassurance they offered, yet others felt that restricting discussions around their struggles perpetuated stigma and discouraged sharing their experiences [42]. Research into moderators' perspectives also reveals how implementing such rules in practice is often more nuanced than a surface-level interpretation of forum rules would suggest [43]. Challenges for moderators included indirect references to risk, time pressures on decision making, and the emergence of unforeseen safeguarding issues. This underlines the need for continuous monitoring and adjustment in each forum's implementation, with particular attention paid to the expertise and community knowledge of forum staff.

This adaptation of existing technology-design guidelines adds to the growing body of literature that employs SDT to inform intervention design and evaluation. A recent review of SDT-informed behavior change technologies highlighted how interventions commonly draw on SDT principles to promote engagement via design features that align with the recommendations offered here [44]. It was suggested that technologists working in areas such as app development could promote autonomy via intuitive interfaces and customizable features, foster competence through positive feedback and encouragement, and enhance relatedness via peer interaction and human support. These insights reinforce the idea that user experiences that satisfy basic psychological needs are relevant targets for interventions across different technological environments. Organizations delivering forums may also benefit from evaluating their services using SDT principles. For example, they could draw on SDT-informed measures of psychological need satisfaction in technology use to better understand the

psychological impact of their technologies and the mechanisms underpinning user engagement [45]. In addition to the forum-specific guidance presented here, designers should also consider broader principles for developing psychosocial interventions. Consistent with the recommendation that forums should be both accessible and usable, user-centred design principles stress the importance of treatment efficiency, ensuring that users can quickly address their relevant goals, and learnability, helping users easily understand and navigate the platform [46]. These considerations are especially pertinent in the online environment, where users are often quick to dismiss content that is difficult to comprehend or not directly relevant to their immediate needs. Beyond focusing on specific implementation techniques, designers should take a holistic view of their services, understanding how various components of their digital offers combine to form coherent ‘intervention systems’ [47]. This system, within its particular context, will produce both intended and unintended outcomes. This perspective highlights the importance of the ongoing iteration of logic models or theories of change, capturing both the positive and potentially negative impacts of forum use and their causes, thus providing direction for service refinement. Aligned with our recommendation to refine forums in collaboration with users to gain insights into their goals, values, and preferences, contemporary intervention design guidelines emphasize the value of stakeholder involvement throughout this process [17]. This includes contributions to intervention development, theory refinement, evaluation, and the dissemination of research findings.

Strengths and Limitations

This study is the first to draw extensively on lived experiences and psychological theory to generate forum design guidance. However, there are several notable limitations. First, experiences reported here were derived from researchers, forum users, and staff based in the UK with a primary area of focus on mental health. This work therefore reflects a subset of online health. Moreover, while health forums are likely to be accessed by people with diverse cognitive and physical abilities, our recruitment process did not engage participants on this basis. Future research centered on understanding the experiences of people with various disabilities could enrich findings in important ways.

The guidance reported here is intended to represent a series of principles and suggestions which forum designers across contexts may select from and adapt for their settings. That said, given the continued growth of online health forums, a valuable direction for future research could be the development of specific practices and protocols, for example around risk management and moderator training, that could be shared across similar service contexts to promote quality and minimize cost. Furthermore, while SDT represents a well-supported theory with significant empirical support and it has been used in intervention design research, it is broad by its nature as a ‘meta theory’ and other, more focused psychological theories, such as those relevant to particular health issues, may be more directly relevant or valuably complement SDT-informed guidance. An important direction for future research is the direct evaluation of theory-based online health forum interventions to fully assess the utility of conceptually informed interventions.

Conclusion

Combining a thorough consideration of forum safety, and an explicit focus on autonomy, competence, and relatedness, we have presented forum designers and organizations a theory-informed approach to service development. While this approach aligns with an extant body of research linking needs satisfaction with positive technology-related outcomes, the growing popularity of online health forums warrants renewed focus on how these widely used services can be optimized using psychological theory and lived experience expertise to the ultimate benefit of user wellbeing.

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Supplementary Files

Multimedia Appendixes

Participant demographics and topic guides.

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