



# Sacred Be Thy Tech

## Thoughts (and Prayers) on Integrating Spirituality in Technology for Health and Well-being

🔗 **C. Estelle Smith**, University of Colorado Boulder

If you've ever seen a sensitive health-disclosure post on social media, you may have also noticed responses containing phrases like, "praying for you," "sending good vibes," or "let me know how I can help." Perhaps it's your favorite-but-oddly-specific support community on Reddit, and one post happened to ride a wave of karma straight to the 📈 of the feed. If you're on Facebook, that post might receive some 🤔, ❤️, and 😊, but on Twitter, it's all about the ❤️. On CaringBridge ([www.caringbridge.org](http://www.caringbridge.org))—an online health journaling platform that serves more than 40 million users a year facing life-critical illness—supporters can share kind words or offer 🙏 and 🙏, occasionally triggering a wave of viral #prayfor[so-and-so] requests.

To varying degrees, the language and graphics of these online interactions clearly evoke *spiritual* or *religious* connotations. Indeed, since the earliest days of human society, spirituality has been tightly knit within the fabric

of our cultures, governance, and health systems. Yet the discipline of human-computer interaction has largely ignored spirituality in computing and technology design. This omission not only marginalizes fundamental aspects of human identity, healing, and experience but also limits the insights and benefits that can be gleaned through human-centered design.

After six years of research in online health communities, my interpretation of the support interactions above is that when people are in a state of crisis, they express and respond to one another's spiritual needs via the sociotechnical mechanisms available to them, whether or not those mechanisms were explicitly designed with spirituality in mind. Yet people often have remarkably different belief systems; this is problematic when a support seeker's needs clash with supporters' responses. Imagine, for example, a post written by an atheist that receives a bunch of "thoughts and prayers" or 🙏 reactions.

### Insights

- ➔ In technology R&D, we must *embrace* rather than *avoid* the fundamental roles of spirituality and religion in users' lives.
- ➔ Spirituality deeply underlies supportive interactions, yet misaligned beliefs can cause problems, both on- and offline.
- ➔ A *whole-human* centered design approach that honors spirituality will contribute to mitigating problems and better serving users' deepest needs.

All of humanity is unlikely to agree on the existence of G/god(s), spiritual entities, or life beyond death. My point has nothing to do with the “truth” of any particular beliefs—and everything to do with the fact that everyone holds their own beliefs near and dear in ways that deeply influence their needs and experiences, especially when facing illness. *If we aim to take a truly human-centered approach, we must account for people’s most deeply held spiritual values when designing sociotechnical systems for health and well-being.*

In this article, I will describe the intertwined personal and research trajectories of my doctoral work that have crystallized my interests in *computational spiritual support*. I’ll begin by defining a few key terms.

## SPIRITUALITY AND HEALTH ACROSS MILLENNIA

Religion refers to institutionalized systems of beliefs, practices, rituals, and values that vary along denominational and doctrinal characteristics and experiences. Spirituality is a broader construct that can encompass religion, as well as nonreligious activities like meditation, exploring nature, breathing exercises, or journaling. The following is a commonly used definition of spirituality derived through a national consensus of health experts and faith leaders [1]: “Spirituality is the aspect of humanity that refers to the way individuals seek and express meaning and purpose, and the way they experience their connectedness to the moment, to self, to others, to nature, and to the significant or sacred.”

Although the diversity of human beliefs is endless, most humans become more concerned with spiritual matters during life-threatening illness, while spiritual communities often rally to support their ill. For example, in Indigenous cultures across the globe, shamans provide leadership and healing rituals to connect their tribes with nature, spirit guides, and ancestors. Ancient Eastern

traditions such as Ayurveda (from India) and traditional Chinese medicine emphasize holistically balancing mind, body, and spirit through nature-based foods, medicines, and exercises. In the Abrahamic traditions of Judaism, Christianity, and Islam, clergy assume an intimate role of guidance for congregants facing health crises by performing sacraments or ceremonies, as well as through softer, more social forms of care. It is equally salient to note that religion can have extremely damaging impacts, such as manipulation or radicalization, repression

**If we aim to take a truly human-centered approach, we must account for people’s most deeply held spiritual values when designing sociotechnical systems for health and well-being.**

or exclusion of disallowed identities, or religious trauma syndrome (RTS)—a PTSD-like condition resulting from abusive or controlling environments, lifestyles, or religious figures.

Given the powerful implications of spirituality for human health and well-being, a variety of medical conferences now have foci at the intersection of medicine, spirituality, and healing [2]. Yet unmet needs for spiritual care continue to rise, especially in light of the Covid-19 pandemic. Set within a healthcare system that was already insufficiently equipped to meet people’s psychosocial needs, the pandemic triggered widespread isolation and a rise in mental illnesses like depression, anxiety, and PTSD. Millions of families lost loved ones without being able to visit the hospital, provide caring in-person presence, or even to hold cherished spiritual ceremonies or funerals. The spiritual toll taken on individual and community health has been devastating—yet the expansive body of HCI work on health and healing has largely ignored spirituality.

So, as a fledgling Ph.D. student, I wouldn’t have believed you, had you shown me the title of my future dissertation: *Beyond Social Support: Spiritual Support as a Novel Design Dimension in Sociotechnical Systems*. Yet here we are—a world where such a document now exists in the Digital Conservancy of the University of Minnesota. Because my positionality as a researcher is inextricable from the analytical lens I have applied, I want to next share the story of how that came to be.

## AN UNEXPECTED RESEARCH TRAJECTORY

*The personal arc.* I was raised in a dogmatic Catholic household where I was not offered the choice to explore my beliefs. I began to experience extreme social anxiety around the age of 11. This evolved into an eating disorder from ages 12 to 19, and an ever-shifting set of diagnoses thereafter. I now attribute the origination of these mental illnesses to RTS. Leaving the church in my early adulthood was a painful but necessary choice for my personal evolution and healing, yet the decision was especially contentious to my mother, whose faith was dear to her. For the next decade, I generally considered myself agnostic/atheistic as I struggled to find meaning and cope, especially following a case of domestic assault against me in my early 20s that added PTSD into the mix, on top of preexisting RTS. Then, as I was considering graduate programs in my late 20s, my mother was unexpectedly diagnosed with a rare and aggressive cancer that took her life within three months. I was shocked. We all were.

A few days after mom’s death, I discovered that her close friend had written a CaringBridge journal for her, sharing all the major situational updates since her diagnosis. No one had told me, and yet somehow, her whole church knew. There were only a handful of posts, given how quickly the cancer had progressed. But during that tender window of profound grief, it moved me deeply to see that folks had been following along with her, sending love and prayers, and even holding vigil for her synchronously the day she died. When I began grad school, my mother’s death was in the rearview mirror by

only about a year. And within a month of starting the program, my co-advisor made an unexpected announcement at a weekly lab meeting. A new collaboration had been forming over the past year with a local nonprofit called CaringBridge—were any Ph.D. students interested? Well, yes. Yes, I was.

As a scientist, I am committed to empiricism and evidence-based pursuit of fact. Much to my surprise, during graduate school, this empiricism intertwined with my own experiences of grief and mental illness to shape my perspective and beliefs toward a more decidedly spiritual, nature-based, and nonreligious view of the world. This sense of spirituality has helped me survive the past few years of global trauma and chaos; I don't believe I would have made it out of grad school alive without it. Because my beliefs have changed multiple times, I now tend toward a *universalist* view that most belief systems point to similar underlying principles. I do not hold absolute perspectives. Rather, I seek to observe and honor the many ways in which spirituality can support (or harm) our healing processes—and to help align technology development with the greater spiritual flourishing and evolution of humanity. I believe science can, and should, help us do so.

**The research arc.** I have read thousands of journal updates and survey responses from CaringBridge users. I have interviewed and conducted design workshops with dozens of stakeholders. Yet one pivotal moment of summer 2017 stands out.

I was working on my second study of CaringBridge at the time. Our first study had shown that, as in my mom's case, approximately 34 percent of all journals for cancer patients concluded with patient death. Yet factors like receiving supportive comments, writing expressively, and offering supportive comments to others correlate with sustained use of the journal [3]. But what about the *content* of these journals? What types of help did CaringBridge users appreciate exchanging during such intense and life-threatening health crises?

I was working with a wonderful undergraduate researcher, Gemma, who was developing our codebook for content analysis. We had begun with conventional social support categories (e.g., informational, emotional, and instrumental support), but we were musing about words like *prayer* and *karma*. A few prior studies had included examples of words like these in their *emotional support* category. But Gemma and I agreed: The way users wrote about prayer was different. It was specific, pervasive, and urgent, and it was often tied to mentions of scriptural names or sacred texts. We decided it would best suit the data to break prayer into its own category.

The decision didn't seem like a huge deal at the time, yet it became the singular moment that would go on to steer my entire dissertation in a new direction. As it turns out, users not only *wrote about* matters of prayer or spiritual support most frequently, but, when we later surveyed them, they also *rated* it more highly than all others [4]. When I first saw the ratings, I had to laugh. It almost felt like my mom was striking back from the grave to show me the power of prayer—with the irony being, of course, that I had arrived at this conclusion only through my most rigorous and scientific efforts.

*Beyond its frequent linguistic appearances as “prayer,” “healing vibes,” or “good karma,” what does the concept of “spiritual support” truly mean to users?* Because of our striking results on prayer support, it became clear to me that something was missing from the HCI literature. Therefore, I next conducted participatory design workshops to define spiritual support, and to understand how stakeholders felt it related to technology design. In late 2019, I had the good fortune to conduct these workshops in person with patients, caregivers, spiritual leaders, health care professionals, and CaringBridge employees shortly before the pandemic. With an eye toward inclusivity, I recruited participants of diverse beliefs, everyone from atheists and agnostics to the three major Abrahamic religions to yogis and shamans. Through this work, I have derived a definition of spiritual support to guide future system development efforts.

## TOWARD COMPUTATIONAL SPIRITUAL SUPPORT

As we defined it in our 2021 paper, “spiritual support is an *integral* dimension that underlies and can be expressed through every category of social support, including informational, emotional, instrumental, network, esteem, and prayer support. This dimension creates a triadic relationship between a recipient, a provider, and the sacred or significant, with the purpose of helping recipients and providers experience a mutually positive presence with each other, and with the sacred or significant” [5].

Participants described their experiences of spiritual support as moments when they felt deeply connected to themselves, to others, and to what brings their life or suffering a sense of meaning. On the surface, supportive behaviors like dropping off a lasagna (instrumental support) or sharing links to medical resources (informational support) could be considered conventional social support. Yet participants told us that these behaviors are motivated by deeper feelings of spiritual connection, and that the delicacy and sensitivity of how they are executed makes a massive difference in how effectively support is received. Thus, accounting for the spiritual dimension of these behaviors in our studies will honor what is most sacred or significant to users, resulting in a *whole-human-centered* approach that empowers practitioners and researchers to design communities, systems, or interventions more attuned to people's deepest needs during their darkest hours. Whereas [5] provides specific design implications, I will focus here on open-ended questions that can shape future research trajectories.

*When is technology the right solution for spiritual support? And when is the better solution to turn all the technology off?* A perennial problem in HCI is to “throw some tech at it” when, in fact, technology could make things worse. A technology like CaringBridge creates meaningful opportunities for spiritual support that could not exist without it. However, participants expressed concerns about how other types of platforms may be more likely to distract from or diminish our capacity to fully realize meaningful human connection during health crises—for example, endless social media scrolling can provide a

too-convenient escape hatch, or a simple 😬 reaction might be a too-easy shortcut. One vein of research should explore how to best facilitate spiritual support, while another should explore how to help people eschew the distractions and eliminate technology uses or behaviors that cause more damage than good.

*How can we design interfaces, algorithms, and support mechanisms that honor spirituality within specific spiritual or religious communities, versus within broader contexts and communities where beliefs can differ extremely?*

Religious disagreements are among the thorniest contentions in human history—causing everything from wars to deathbed familial estrangements. People’s spiritual beliefs are always deeply personal, and can vary significantly even when people share the same creed. Future research should explore how to shape support interactions that foster respect and care, even when people disagree. Some solutions should be tailored for groups that generally *do* agree (e.g., a specific temple, church, mosque, or ashram), whereas others must confront the reality of spiritual heterogeneity in online spaces.

*How can technology support spiritual plasticity and flourishing, rather than repressive or traumatizing adherence to beliefs that no longer serve an individual?* In my mom’s case, Catholic rituals were undeniably the most sustaining form of support she received as she died. Yet had I been in her shoes, to impose those same practices upon me would have been utterly inhumane. My workshop participants discussed a basic need for people to have the flexibility to explore their beliefs, adapting them as necessary in light of the new realities of illness. In cases where spiritual plasticity does not exist, they shared examples of terrible suffering that stems from problematic beliefs (e.g., “I am dying of cancer because I sinned”). Yet both hierarchical religious structures and online affordances tend to enforce existing practices or norms, which may be damaging or inappropriate in some cases. Future research should draw upon community assets to support people, while also remaining sensitive to individual processes for discerning, articulating, and adapting their spiritual needs.

Many additional questions are also worth exploring, such as:

- How can we collaborate with medical communities to integrate clinically validated evidence and best practices for spiritual care in sociotechnical systems that extend within and beyond clinical settings?

- What are the roles of AI and automation in the provision of spiritual support? How can we design these effectively and ethically?

- How can we ensure that technologically mediated forms of spiritual support do not diminish the authenticity, meaningfulness, and quality of supportive interactions and relationships?

## CONCLUSION

In 2013, Elizabeth Buie and Mark Blythe speculated that the discipline of HCI may have historically avoided spirituality and religion due to the difficulty and

sensitivity of this line of work, along with concerns about perceived scientific legitimacy, funding opportunities, and professional reputation [6]. However, given that institutions such as the Vatican [7], individual spiritual communities [8], and tech giants like Facebook [9] are now using technology to coordinate spiritual communities and activities, it is vital that researchers challenge the entrenched status quo and examine spirituality in these contexts. I believe that pursuing questions of the nature described above will empower individuals and communities to provide more sustained, holistic, and humane care with improved patient outcomes. And I look forward to connecting with communities of research and practice that are ready to adopt a whole-human-centered approach, and to pave the path toward the conscientious, respectful, and ethical integration of spirituality in technologies for health and wellness.

---

## ENDNOTES

1. Puchalski, C. et al. Improving the quality of spiritual care as a dimension of palliative care: The report of the consensus conference. *Journal of Palliative Medicine* 12, 10 (Oct. 2009), 885–904; <https://doi.org/10.1089/jpm.2009.0142>
2. For example, Conference on Medicine and Religion ([www.medicineandreligion.com](http://www.medicineandreligion.com)), Annual Conference on Caring for the Human Spirit ([www.spiritualcareassociation.org/conference](http://www.spiritualcareassociation.org/conference)), and Annual Assembly of Hospice and Palliative Care (<http://aahpm.org/meetings/assembly>).
3. Ma, H. et al. Write for life: Persisting in online health communities through expressive writing and social support. *Proc. ACM Hum.-Comput. Interact.* 1, CSCW (Dec. 2017), 73:1–73:24; <https://doi.org/10.1145/3134708>
4. Smith, C.E. et al. “I cannot do all of this alone”: Exploring instrumental and prayer support in online health communities. *ACM Trans. on Computer-Human Interaction* 27, 5 (Aug. 2020), 38:1–38:41; <https://doi.org/10.1145/3402855>
5. Smith, C.E., Kaur, A., Gach, K.Z., Terveen, L., Kreitzer, M.J., and O’Conner-Von, S. What is spiritual support and how might it impact the design of online communities? *Proc. of the ACM on Human-Computer Interaction* 5, CSCW1 (Apr. 2021), 1–42; <https://doi.org/10.1145/3449117>
6. Buie, E. and Blythe, M. Spirituality: There’s an app for that! (but not a lot of research). *CHI ’13 Extended Abstracts on Human Factors in Computing Systems*. ACM, New York, 2013, 2315; <https://doi.org/10.1145/2468356.2468754>
7. England, R. Vatican launches \$110 ‘click to pray’ wearable rosary. *Engadget*. Oct. 16, 2019; <https://www.engadget.com/2019/10/16/vatican-click-to-pray-wearable-rosary/>
8. Adamy, J. Churches changed during the pandemic and many aren’t going back. *Wall Street Journal*. Nov. 12, 2021; <https://www.wsj.com/articles/church-pandemic-covid-online-11636728162>
9. Dias, E. Facebook’s next target: The religious experience. *New York Times*. Jul. 25, 2021; <https://www.nytimes.com/2021/07/25/us/facebook-church.html>

---

👤 **C. Estelle Smith** is currently a postdoctoral associate in the Department of Information Science at the University of Colorado Boulder, and will be joining the Department of Computer Science at the Colorado School of Mines as a tenure track assistant professor in January 2023. In partnership with organizations like CaringBridge, the Wikimedia Foundation, and Reddit, her research explores computational spiritual support and mental health care in online communities and sociotechnical systems.

→ [c.estelle.smith@colorado.edu](mailto:c.estelle.smith@colorado.edu)

📧 [estellesmithphd.com](mailto:estellesmithphd.com)

