
Spirituality: There's an App for That! (But Not a Lot of Research)

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Abstract

The iTunes App Store contains over six thousand apps related to spirituality and religion. The ACM digital library, however, contains only 98 works that address this topic from an HCI perspective. Despite high-profile calls for research in the area, the HCI community has produced only 19 research papers focused on the topic, almost half of which are the work of one person and her colleagues. In this paper we provide an overview of the relevant HCI research in this area, a partial inventory of spiritually oriented apps in the iTunes US App Store, and a comparison of research and real-world developments. We discuss the gaps in the HCI literature on techno-spiritual practices and speculate about some of the difficulties and challenges that face the HCI community in conducting research in this area.

Author Keywords

Spirituality; religion; techno-spirituality

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

For about a decade, Intel anthropologist Genevieve Bell has urged the human-computer interaction (HCI) research community to devote more research to the

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use of technology in spirituality and religion (e.g., [2], [3], [4]). In her keynote plenary address at CHI 2010 [4], Bell mentioned spirituality as one of the most important underexplored areas of HCI research, and as long ago as 2003 she reported [2] that approximately as many Americans had searched the Internet for information on religion as had downloaded music.

Recent data give additional weight to Bell's injunctions. Spirituality and religion are a part of life for the vast majority of people: more than 80% of the world's population describe themselves as affiliated with a religious group [22]. The use of technology in religion and spirituality is also high: Thumma [26] reports that in 2010, 69% of American religious congregations had websites and 90% used email; and our own exploration of the iTunes US App Store (described below) leads us to estimate that at least 6,000 iPhone and iPad apps exist to support various aspects of spirituality and religion. Bell has coined a term — "techno-spiritual practices" [3] — to characterize the use of technology in religious and spiritual practices and experiences.

Yet techno-spirituality continues to receive short shrift from the HCI community, lagging behind the closely related areas of aesthetics, emotion, affect, and other components of subjective user experience. What is HCI research missing, and why does the community seem reluctant to explore techno-spirituality?

In this paper we study the gaps in HCI research on techno-spirituality and explore some possible reasons why it lags behind related research and existing technologies. Our goal is to map the challenges for further research in this area.

ACM Papers

The field of HCI continues to expand its scope beyond work environments and cognitive task orientation to where it increasingly, as Bødker [6] urged several years ago, "embrace[s] people's whole lives" (p. 6) and, as Cockton [8] suggested, focuses on "the worthwhile, that is, things that will be valued" (p. 168). These considerations include emotion and other aspects of subjective experience, as well as contexts such as home, play, and the arts. As Bell [3] explained, they also include spirituality, as evidenced by "techno-spiritual re-purposing" (p. 142) of information and communications technology (ICT) to support spiritual practices.

Method

This study began with a full-text search of the ACM Digital Library (ACM-DL) on six keywords: *religion*, *spiritual*, *spirituality*, *faith*, *numinous*, and *transcendent*. We searched on the full text, rather than on author keywords, to ensure that we obtained items that addressed the topic even when it was not a primary focus. We limited our search to publications from ACM and affiliated organizations because we were looking at the work of SIGCHI and sister communities.

For each keyword, we downloaded the papers and articles whose abstracts indicated that they might be relevant (the item appeared to address some aspect of techno-spirituality from an HCI perspective); then we read the items we had downloaded and selected those that were appropriate for use in the analysis. Papers considered not appropriate often used the terms in ways other than what would indicate religious and spiritual life — e.g., "in good faith" or "the spiritual successor to {X} project" or "the religion of open

Class	Count	Years
Focused	22	1996–2012
Covering	10	2007–2012
Finding	14	2008–2012
Peripheral	33	2002–2012
Design	7	2007–2011
Meta	12	2002–2011
Total	98	1996–2012

Table 1. Items from ACM and affiliated societies (as of 20 December 2012) that relate to HCI and techno-spirituality

Date Range	Total Items	Research Items
Pre-1996	0	0
1996–2000	1	0
2001–2004	3	2
2005–2008	8	8
2009–6/2012	10	9
Total	22	19

Table 2. HCI papers directly focused on techno-spirituality

source”. We also eliminated items that mentioned spirituality or religion in passing but not as an important factor in the work — e.g., several studies looked at many facets of a culture but listed “religion” or “spirituality” only in the list of facets and did not go into further depth.

We categorized the final group of items into six classes (see the numbers in Table 1):

- *Focused*: Directly and primarily focused on techno-spirituality (“t-s”)
- *Covering*: Addressing t-s as a partial focus (e.g., as one component of several)
- *Finding*: Producing relevant findings although not focused on t-s *per se* (e.g., a finding of spirituality as a concern of elderly people in using technology for physical therapy)
- *Peripheral*: Addressing a different but potentially relevant topic (e.g., papers about HCI and death that do not explicitly mention the spiritual aspect but would be fertile ground)
- *Design*: Describing digital/technical designs that foster spiritual or transcendent experiences
- *Meta*: Encouraging the HCI community to address more research to techno-spirituality, or discussing the state of such research

Final corpus

Our selection approach gave us a total of 98 papers, articles, and other contributions. We used two criteria in selecting items: The work had to be published or available in a public resource of ACM or its affiliated organizations and had to associate itself with HCI or its cognate fields; and it had to deal with

spirituality or religion, as we determined it.

We do not limit spirituality to religion or theology, but see it as a sense of deep connection to something larger than oneself, whatever that may be (a deity, nature, a cause, the Universe, an intimate group...). We are interested in all user experiences that can be described as spiritual, religious, transcendent, or numinous. We use “spiritual” to encompass all of these.

Literature review

The HCI literature in our corpus considers revealed three main themes of techno-spiritual research in HCI: institutional, practical, and experiential.

- *Institutional*. This line of research focused on the ways in which religious groups adopted and adapted new technologies. Religious groups often use ICT for communicating their messages and fostering their members’ spiritual growth. In a study of Protestant pastors, for example, Wyche, Hayes, Harvel, & Grinter [31] found that the ministers used ICT mainly for three aspects of their religious work: “research and reflection, sermons, and pastoral care” (p. 207). The authors report some observations that the pastors offered about the reactions of their members (e.g., that some preferred electronically mediated means of counseling because they were more comfortable in discussing difficult topics), although this particular study did not interview members about their own spiritual experiences. Similarly, Wyche, Medynskiy, & Grinter [32] studied the use of large displays for Protestant mega-church services in the USA.
- *Practical*. Some ICTs are important in enabling people to carry out their spiritual practices but

involve no direct participation in the experiences. Woodruff, Augustin, & Foucalt [28], for example, studied Orthodox Jewish families' use of home automation in their Sabbath practices. This technology switches lights and appliances on and off according to a preset schedule, allowing families not only to benefit from electrical devices without controlling them manually but also to practice Sabbath reflection and "submission to external processes and entities" (p. 532). The authors found particularly striking "the orientation to external forces... [which] is in stark contrast with traditional visions of the smart home, which focus on control and mastery" (p. 534).

- *Experiential.* Some techno-spiritual works in the HCI research literature describe particular designs that appear to provide some aspect of the immediate spiritual experience. Examples of experiential ICTs include AltarNation [12], an interactive environment that uses telepresence to help physically isolated people meditate with others online, and also the Espanta Espíritos [9], "an interactive sculpture that embodies the spiritual and physical features of a wind chime" and invites people to respond to it spiritually (p. 425). The experiential role for techno-spiritual ICT appears rather more sparsely in the literature that we have found than does either the institutional or the practical. In addition, for the most part the research has not analyzed the characteristics of the experiences or of the technologies that facilitate them: we found only one paper ([16]) that addressed the "transcendent" characteristics of different technologies.

The institutional, practical, and experiential roles are not mutually exclusive: some spiritually oriented ICTs exhibit aspects of more than one. For example, the "Sun Dial" [29] appears both practical and somewhat experiential. This smartphone app for Muslims indicates when one of the five daily prayer times is close and then helps locate the direction of Mecca. This aspect is practical, but the app's visual design incorporates Islamic imagery to provide a more spiritual approach to the user experience than do existing systems, which "typically rely on text and numbers to communicate prayer times" (p. 56). Noting that the users responded positively to the sacred imagery, Wyche et al. [29] commented that the imagery "worked in similar ways to the uses of imagery in other artifacts (such as those in prayer rugs) to help connect believers to the experience of their faith" (p. 58).

Other examples of ICTs in the literature that may take on multiple roles include the Prayer Companion [10], designed to give a community of cloistered nuns information on outside events about which they might pray (practical and experiential); and Sterling & Zimmerman's [25] mobile applications for a Buddhist community (institutional and experiential).

In the Wild

Having overviewed the research in the HCI literature we decided it might be useful to contrast this work with current technological developments. The iTunes app store was chosen as a place to reflect on recent technological developments. The pace and scale of app development and distribution is astonishing and well documented. In 2009 there were approximately 25,000 apps in 2012 there were more than 775,000. Apple recently announced it had reached 40 billion unique



Figure 1. Image from “MyPrayer” (Islamic)

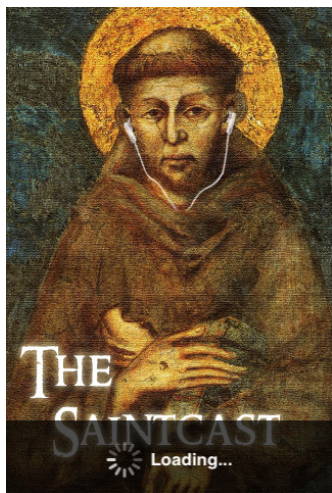


Figure 2. Image from “The SaintCast” (Christian, Catholic)

downloads with half of these occurring in 2012 alone. (Reisinger 2009). Searching the app store then provides some indication of current technological developments “in the wild”.

iTunes App Store

We conducted a partial inventory of the Apple Inc. iTunes United States App Store, to get an idea of the number and types of mobile applications that are available to support spirituality.

The limitations of the App Store search facility make it impossible to determine how many techno-spiritual apps existed at any specific time in the past. It seems safe to say, however, that given the extraordinary growth in total offerings since the iTunes App Store opened in July of 2008 [1] — an 18-fold increase in 4.3 years, roughly doubling every year — the number of apps related to spirituality is likely to have experienced strong growth as well. Our study analyzed the offerings available in early December of 2012.

Method

The app analysis began with a search of the US App Store for iPhone® and iPad® apps that met our criteria. (We chose the US App Store because we felt it would give us the broadest picture of the relevant apps available.) We began by searching on *spiritual* and *religion* and reviewing the results; then we expanded our search to seek out additional apps for generic keywords. (We did not search on keywords for specific faith traditions, such as *christianity* or *islam*; those will be used in follow-on work.) In all, we searched on 13 terms: (in alphabetical order) *divine*, *holy*, *inner peace*, *inspiration*, *meditation*, *mindfulness*, *prayer*, *religion*, *sacred*, *spirit*, *spiritual*, *spirituality*, and *uplift*. (We also searched on *numinous*

and *transcendent* but did not find anything relevant, so we do not mention them further in this paper.)

We sorted the search results in descending order of average customer rating and recorded the name and search term of each app that scored 4 or higher (on a 5-point scale). We then went through the list and eliminated duplicates that were due to platform (iPhone and iPad), version (e.g., “lite” vs. regular or “Pro”), and search term (some apps appeared in more than one set of search results). We also removed apps that were not relevant to spirituality — e.g., the search for “spirit” returned several apps on spirit levels (a building construction tool) and several on alcoholic beverages. Table 3 shows the numbers of apps found for each search term¹.

Overview of apps found

The final list contains approximately 1500 unique iOS apps that have a “4” or higher average customer rating. This figure, plus the average proportion of 4+ apps to all apps in our total search results (approximately 1 in 4), leads us to estimate that the total number of unique iOS apps for these keywords is likely to be somewhere in the neighborhood of 6,000. Searches on particular faith terms yielded the results shown in Table 4.

We find some surprises here. By far the largest number of returns in for both iPad and iPhone apps were for Islam (almost double the total for the other six), and Wicca is more popular than Hinduism. Some would argue that atheism is not a faith term, but we include it here as a recognized and widely popular perspective on spirituality.

¹ The table does not show totals because many apps appeared in the search results for multiple keywords and most are available for both iPhone and iPad.



Figure 3. Image from
"Shabbat Shalom" (Jewish)



Figure 4. Image from
"MyAarti" (Hindu)

Keyword	iPad	iPhone
Meditation	990	1914
Religion	817	1550
Prayer	562	1434
Holy	478	916
Spirit	471	1074
Inspiration	378	839
Spiritual	308	597
Spirituality	164	324
Divine	81	183
Mindfulness	66	166
Sacred	65	100
Inner Peace	15	30
Uplift	5	22

Table 3. iPad and iPhone returns for the 13 general search terms (in order by number of iPad apps).

Religion	iPad	iPhone
Islam	1046	2522
Christianity	205	398
Buddhism	155	313
Judaism	106	187
Wicca	47	147
Hinduism	26	68
Atheism	16	24

Table 4. iPad and iPhone returns on specific faith terms.

It would be interesting to speculate about the surprising results in Table 4, but in this paper we limit the discussion to spirituality in general rather than addressing specific faiths. We will point out, however, that Hindu apps did appear rather more frequently under "spiritual".

Preliminary app analysis

In preparing the inventory, we examined the apps' titles and, in some cases, descriptions, to ensure that we listed only apps related to spirituality. In this process we noticed apps with features and uses that we have not found to be covered by the current HCI literature:

- education (especially of children)
- prayer exchanges
- daily inspirations/prayers/verses
- trivia quizzes
- stories
- comparisons of different faiths
- guidance for daily living
- teachings and sermons from specific leaders

We anticipate that further analysis will reveal even more uses that the literature has missed.

Discussion

Gaps in HCI research to date

To date, HCI research on techno-spirituality misses a considerable amount of what's out there in the wild. Moreover, very few people are studying this area: almost half of the research papers in our corpus (eight out of 19) are the work of one person and her collaborators, and that person has moved on to other topics (Wyche, personal communication, 2012).

Challenges for App Store analysis

Analyzing the App Store presents many challenges. The contents are volatile, as apps appear and disappear continually, and a search must therefore be conducted within a very short time. Apple has removed from its App Store search facility the capability to sort search results, and much of the information we sought is not available via current software. (For this paper, we used



Figure 5. Image from Sirian “Starseed Tarot” (New Age)

an older version of iOS to conduct the search.) In addition, recording detailed information about an app requires retrieving its page on itunes.apple.com, as the iOS app screens do not support text selection and copy.

Challenges for addressing spirituality

As we have noted above, ten years or more have passed since the CHI community first received calls to study spirituality and religion. Why, then, does this research continue to be so sparse in the literature? Calls for investigating subjective user experience, aesthetics, emotion, affect, and similar topics began at about the same time, yet those areas flourish; they do not languish the way spirituality does. What’s the key?

Why does techno-spirituality lag behind related areas?

The following sections are speculative but are based on our own experience and on conversations with other researchers interested in this field.

BECAUSE IT’S IRRELEVANT TO THE HCI COMMUNITY?

It may be that despite Bell’s fairly high-profile calls, HCI researchers consider spirituality irrelevant to their work. The academic community tends to be less religious than other segments of the population: a recent survey of academics found that 52% reported no religious affiliation, as compared with 14% of the general population [10]. (Similarly, Bell [4] points out that it is likely there is little research on sports in HCI because, as a community, we ourselves are not interested in sports.) It does not follow, however, that because a topic is irrelevant in a researcher’s personal life it is irrelevant to their work. Many young HCI researchers have engaged in research on aging although their most direct connection with that topic would likely be no closer than grandparents or parents.

CHI is more interested than ever in aesthetics, experience, and affect. We contend that studying spirituality and religion would broaden and deepen our understanding of these aspects of life.

BECAUSE IT’S NOT FUNDED?

It is perhaps an obvious point, but one nevertheless worth making, that what gets research depends in large part on what gets funded. In the UK the research agenda is set by government research councils, and despite academic protest, calls are increasingly shaped by the political agenda of the party currently in power [13]. However it is possible to address issues of spirituality within topics currently funded, such as aging e.g. [11]. There are also other sources of funding (business, charity, individual) so funding alone does not account for the gap.

BECAUSE IT’S DIFFICULT?

Methodologically, studying subjective experience *per se* is hard. Although the past few years have seen the development of methodologies for doing that (e.g., [5] [15] [18] [21]), it remains a thorny problem, as people tend to find it difficult to articulate their experiences. Part of the difficulty is that an interest in subjective experience entails, to some degree, moving away from purely objective observation. Taking someone else’s experience seriously requires empathy and a relationship with that person [29], neither one a traditional feature of objective scientific investigation. Taking seriously one’s own experience requires a turn to reflectivity and introspection [21] — again, techniques not usually associated with scientific inquiry. In addition, spiritual or religious experiences can be deeply personal and difficult to articulate, let alone share with a researcher.

BECAUSE IT'S SENSITIVE?

A cliché holds that polite company avoids discussing three topics — sex, politics, and religion. The questions surrounding whether to develop technologies to support commerce, surveillance, or warfare are clearly political, though they are rarely discussed explicitly as such in HCI venues. Public *policy*, on the other hand, is very much a concern (see, e.g., [17]), with SIGCHI having an International Public Policy Committee. A sizeable amount of HCI work addresses topics such as sustainability, public health, voting systems, and the usability of government systems [7], all of which could carry a political charge if their proponents were not careful. A small but growing body of work has begun to address sexuality in HCI [13], but addressing the topic is not easy: the Bardzells have, for instance, been asked to refer instead and euphemistically to “intimacy” (*ibid*). Furthermore, the topic of religion is deeply sensitive in many parts of the world, and researchers may understandably fear for their personal safety.

BECAUSE IT'S PROFESSIONALLY RISKY?

We suspect that some researchers hesitate to study spirituality for fear of being dismissed as having a religious agenda. We confess to having more than a wee bit of sympathy with this concern, although we are confident that the objections can be countered.

BECAUSE IT'S UNSCIENTIFIC?

Some researchers may hold the opinion that the CHI community should not address religion and spirituality at all, claiming that the subject itself is not scientific and that scientists would give it undue credence by the very act of studying it. Evangelical atheists such as Richard Dawkins might well argue that we might as well study the ways in which computing technology might

facilitate experiences of a giant spaghetti monster. We find this to be a specious argument: a subject can be studied scientifically without any position being implied regarding the subject itself, and any area that is a part of so many people's lives and uses technology is a vital topic for HCI research.

Addressing the concerns

In these concerns we detect echoes of a controversy that occurred some 30 years ago regarding research into near-death experiences (NDEs). We draw inspiration from five points that Widdison [27] offered at that time (and we quote):

- Scientists are not immune to the influence of their culture.
- Personal values affect what scientists define as appropriate fields of research.
- Scientists tend to condemn research that does not fit their concept of what is "scientific."
- If technology hasn't progressed far enough scientific research may be inhibited.
- The postulates of science are applied differentially depending upon the acceptability of the research area. (p. 9)

Widdison illustrated by describing several NDE research projects that he considered scientific.

Conclusions

This paper has described a review of the relevant literature and also of well-regarded apps for techno-spirituality. We have demonstrated that the rate of growth in the HCI literature pales in comparison to the growth in relevant technologies. We have identified

scores of spiritually oriented apps that provide features and uses that we have not found to be covered by the current HCI literature, including education (especially of children), prayer exchanges, daily inspirations/prayers/verses, trivia quizzes, stories, comparisons of faiths, and guidance for daily living.

Despite a decade of urging, the CHI community, with a few outstanding exceptions, has not taken up the challenge of studying techno-spirituality.

Any aspect of life that uses technology is fair game for HCI research and can be approached scientifically. Any area of life that touches so very many of the world's people and uses technology so heavily can — indeed, *must* — be a subject for HCI research.

It is high time for CHI to get into the spirit.

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