

## **Designing Transcendence Technology**

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*So amazing this choir of socks, shoes, shirt, skirt, undergarments, earth, sky, suns, and moons. No wonder I too, now, sing all day.*

-Rabia, 717-801, Islamic saint (Ladinsky, 2002, p.28)

*In my travels I spent time with a great yogi. Once he said to me, "Become so still you hear the blood flowing through your veins." One night as I sat in quiet, I seemed on the verge of entering a world inside so vast, I know it is the source of all of us.*

-Mirabai, 1498-1550, Indian mystic poet (Ladinsky, 2002, p.249)

*We are all caught in an inescapable network of mutuality, tied in a single garment of destiny. Whatever affects one destiny, affects all indirectly.*

-Rev. Dr. Martin Luther King, Jr., 1929-1968, Christian preacher and civil rights leader (King, 1963/2004, p.35)

It has been called samadhi, enlightenment, non-dual experience, and many other names. In this chapter, I will call it *living deeply* or *transcendence*: the experience of moving beyond the self and everyday perceptual and cognitive functioning to connect with others and come to know an essential and pervasive truth. Three fundamental elements of transcendence are addressed in the quotes beginning this chapter: Rabia tells us about her experience of joyously moving beyond the self and everyday mental functions, Mirabai describes connecting with others as a result of moving beyond the self, and Dr. Martin Luther King, Jr. explains the insight of fundamental unity, one of the essential truths understood by anyone who has experienced a transcendent state.

Transcendence Tech, a new field with roots in ancient mysticism, uses technology and design fundamentals to facilitate these three basic elements of transcendence: moving beyond the self, connecting with others, and sharing pro-social goals and ideas. After briefly describing the technological and personal contexts for this chapter, I will discuss a scientifically vetted model of the path to transcendence and describe how specific examples of Transcendence Technology support each step in the path toward living deeply. Finally, I describe my sense of the strengths, potential future directions, and weaknesses of Transcendence Tech.

### **Technological context**

In the past ten years, several overlapping well-being tech movements have emerged among designers and technologists. The basic idea behind these movements is that we need to start creating technology not only to improve productivity, solve business problems, and treat diseases, but to support the flourishing of well-being (Table 1).

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**Table 1.** Conceptually overlapping movements. The information in the “focus” and “community” columns is based on interpretation of the websites given as well as inside knowledge of many of these communities, and therefore is subject to bias.

movement	focus	community	website
Buddhist Geeks	supporting mindfulness and meditation	academic, corporate, entrepreneurial, and hacker	buddhistgeeks.com
Calm Technology	promoting simple, clear, unobtrusive design	academic, corporate, entrepreneurial	calmtechnology.com
Calming Technology	inducing cognitive, affective, and physiological calm	academic, entrepreneurial	calmingtechnology.org
Consciousness Hacking	exploration of consciousness and well-being	academic, entrepreneurial, and hacker	consciousnesshacking.org
Essential Self Technology	supporting embodiment, autonomic resilience, emotional self-regulation	academic, corporate, entrepreneurial, and hacker	essentialself.org
Positive Computing	facilitating meaning, compassion, self-actualization, altruism	academic and entrepreneurial	positivecomputing.org
Positive Technology	improving physical and psychological well-being	academic and entrepreneurial	giusepperiva.com
Transcendence Technology	wayfinding on the path to transcendence	academic, corporate, entrepreneurial and hacker	noetic.org/innovation
Transformative Technology	improving physical and psychological well-being and productivity	academic, corporate, entrepreneurial, and hacker	transtechlab.org
UX for Good	solving discrete social problems	corporate, entrepreneurial and hacker	uxforgood.com
Wisdom 2.0	improving mindfulness and wisdom	corporate, entrepreneurial, academic, and venture capital	wisdom2summit.com

Each movement has its own unique focus and community, but common to all of them is the intention to improve psychological well-being (Table 1). The Buddhist Geeks are a diverse and growing community of meditators and people with an interest in higher consciousness who also engage in advances in technology that they hope facilitate these interests ([buddhistgeeks.com](http://buddhistgeeks.com)). The Calm Technology movement is about creating simple, unobtrusive design that is calming as a side effect ([calmtechnology.com](http://calmtechnology.com)), while the Calming Technology movement is meant to focus on technology that induces calming experience as its main purpose ([calmingtechnology.org](http://calmingtechnology.org)). Meanwhile, the Consciousness Hacking community is a growing movement of scientists and hackers who want to take “a hands-on approach to making new tools for self-exploration, in order to positively change the way we think, feel, and live” ([www.consciousnesshacking.org](http://www.consciousnesshacking.org)). The Essential Self movement arose as a response to the Quantified Self movement; while the Quantified Self movement focuses on tracking quantifiable data about oneself and therefore takes users out of themselves, Essential Self Technology is about connecting with and experiencing oneself gently and with compassion ([essentialself.org](http://essentialself.org)). The Positive Computing movement, spearheaded by Rafael Calvo and Dorian Peters, is focused primarily on eudaimonic well-being. That is, designers of Positive Computing products aim to help their users engage meaning and fulfill their potential ([positivecomputing.org](http://positivecomputing.org)). Positive Technology focuses on both hedonic and eudaimonic well-being; that is, these designers aim to bring pleasurable emotions, meaning, and connection into the lives of their users ([giusepperiva.com](http://giusepperiva.com)). Transformative Technology is an even newer field, but thus far based on their first annual conference and their first lab at Sofia University, Transformative Tech seems focused on physical and psychological well-being, primarily as accomplished through virtual reality and neurofeedback ([transtechlab.org](http://transtechlab.org)). UX for Good is a community of user experience designers who gather together periodically to complete clearly defined projects that solve social problems ([uxforgood.com](http://uxforgood.com)). Wisdom 2.0 is a series of conferences held around the world, focusing the corporate, entrepreneurial and venture capital communities on mindfulness ([wisdom2summit.com](http://wisdom2summit.com)).

Where does Transcendence Tech fit in this space? Designers producing Transcendence Tech are specifically aiming towards helping users move forward on a path towards transcendence, which includes moving beyond the self, connecting with others, and having an internal experience of truth. This internal experience of truth can seem very much like accessing faith, a sense of the sacred, or divinity. So in addition to the specific focus on a path towards transcendence, Transcendence Tech also differs from most of these other movements in that it offers a place for technology and the sacred to co-exist and inform one another.

Why is Transcendence Tech necessary? In their excellent book *Positive Computing*, Calvo and Peters discuss a positive psychology model in which they identify six design factors that have a direct relationship with well-being: autonomy, positive emotions,

competence, engagement, relatedness, and meaning (2014). They point out that each of these factors can relate to design components that are focused on the self, relationships with others, or with a transcendent or spiritual state. Calvo and Peters state that although their work is not focused on spirituality and transcendence, it is clear from multiple studies that transcendence is a key factor supporting physical and psychological well-being. For instance, a validated measure of self-transcendence was found to directly predict self-reports of physical health (Vieten, Cohen, Schlitz, Estrada, Radin, & Delorme, 2014). Further, the self-reported experience of transcendence predicts decreased levels of depression in elders (Kim, Hayward, & Reed, 2014).

The evidence for a powerful role of transcendence in human psychology is strong enough that the World Psychiatric Association released a statement urging all psychiatrists and psychological professionals to have conversations with their patients about spiritual and transcendent dimensions of their experience (Moreira-Almeida, Sharma, Janse van Rensburg, Verhagen, & Cook, 2015). One problem, according to techno-anthropologist Genevieve Bell, is that at the same time as we are discovering the importance of transcendence to physical and psychological well-being, we are afraid of technology related to meaning and transcendence, including a sense of the sacred (Bell, 2006). Transcendence Technology is meant to help us stop being afraid and start embracing a scientifically validated path to transcendence.

### **Personal context**

Here I describe a pivotal moment in my life and its aftermath as a personal introduction that will lead into a more generalizable, research-based model of the path to transcendence.

I was 21. On a road trip with three other students from my college in Ohio to visit friends in New York, we had a life-threatening accident. All three of us survived without injury. But as I look back, I see it was the first experience I'd had that radically transformed my worldview. It took a few years to sink in, but I couldn't deny what had happened. The inability to deny my own experience set me on a path that, more often than ever these days, continues to move me towards experiencing transcendence.

It was late at night, or perhaps very early in the morning. We were on highway 80, and I was sitting in the front passenger seat, blankly watching Pennsylvania go by. One friend, I'll call him Tim, was asleep in the back. The other friend was driving; I'll call her Sarah. Sarah asked me to take the wheel while she changed her shoes. I worried briefly, then like the youngster I was, I figured it was okay. My logic was that there was no one else on the road, and she should probably drive in comfortable shoes. Though I was normally careful, at this point I must have been tired and thoughtless. "Sure," I told her.

Sarah bent down to change her shoes, and I leaned over to take the wheel. We were going about 70 miles per hour. Everything was fine until I had a feeling I'd never felt before or

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since – it was a strong compulsion to avoid something in front of the car, when I could see nothing but open highway in front of us. I knew I had to turn sharply right, but I didn't know why. The compulsion was so strong, but there was no evidence for why I should listen to it. So as Sarah got her shoes on, I turned the wheel quickly to avoid hitting something I couldn't even see. I was on the passenger side, so I couldn't slow the car. And for some reason I could not tell Sarah to put on the brakes. The sharp turn I'd made at the speed we were going flipped the car 360 degrees end over end, crushing the roof, and landing us in a ditch at the side of the road.

I remember very clearly what I thought I experienced while the car was flipping. First, I noticed I was not scared, and I was pleasantly surprised by that. Instead, I was observant and curious. I saw Tim, who did not have his seatbelt on, being tossed above and then below me as the car flipped. He said, "What?" in mid-air, and I realized the flip must have woken him up. I thought it was good he woke up in mid-air, as his body was probably very relaxed. I saw Sarah in the driver's seat, and she looked terrified. I thought at her, "It's going to be okay. We just had to turn." And I saw the roof of the car, heard it when it was crushed in by the ground. I thought, "That's wonderful – Tim is not in that part of the car, so that works out well."

After we landed, a truck driver who was behind us ran up to ask if we were okay. He said he saw the whole thing, and could not believe we were uninjured. He called an ambulance just in case, we went to the emergency room, called our parents, then checked out of the ER. Undaunted, we took a bus to New York to visit our friends.

Unlike many people who have had a near-death experience, I did not remember seeing myself or the car from the outside. But I did have a sublime feeling of peace and a lack of fear, echoing these same emotions felt by many near-death experiencers who find themselves in extreme circumstances even though they are not dying (Charland-Verville et al., 2014). I don't know whether I had a near-death experience or not, but I do know that for a long time afterwards I worried that I was going crazy because I put us all in danger due to a potentially delusional thought. I worried because even though we were all okay, I didn't understand why I was so compelled to turn the car to the right. To this day, I wonder what happened. But I am sure that I felt strongly without a doubt I had to turn the car, and I also felt with some kind of solid knowing that we would all be okay.

The point that is pertinent here is this. Before the accident, I was a neuroscience major and computer science minor in college who believed strongly in the worldview in which I had been trained, which told me that the only way of knowing something for sure was to test an idea empirically and determine whether the results of the experiment confirmed or refuted the idea. After the accident, I began looking at my own experience that night as a drastic empirical test of the idea that one can actually know something through the "back end" of intuition and gut feelings rather than the "front end" of logic and conscious observation.

Since the accident, I haven't done anything that could so clearly put people's lives in danger, but I have had a few similarly strange experiences that have turned out to be very helpful. For instance, there was the time I felt unusually compelled to check on whether my son had locked the garage after parking his bike there, and on the way back from the garage I spotted an electrical fire a few feet away from my husband's oxygen tank. And there was the time I was terribly worried about my husband, who had been sick for years from a lung disease that would require a transplant but for whom there were no donor lungs. I went to the garden to soothe my nerves and a moment of knowing came over me, for which I am still grateful. I knew, with some kind of inner, solid knowledge, that he would be perfectly fine. And now he is. That moment got me through a year of the worst sort of difficulty, because I never doubted that inner knowing.

This experience of inner knowing or direct access to wisdom has been called noetic experience, from the Greek *noēsis/noētikos*. In the world of science, noetic experience is generally not taken seriously. In fact, the scientific method saved us from the dangerous rule of noetic experience. After all, before science came along, anyone could have claimed they just *knew* that a particular idea was correct, even if that idea was very dangerous. Exactly like my bizarre car accident. This is a very real benefit of science; the democratization of ideas. You can set up an experiment to test an idea, and anyone with proper training and equipment can do the test. You don't have to believe that someone else's intuition is correct.

The problem is that in none of these circumstances – on the highway that night, on my way back from the garage, working in the garden – would the scientific method have helped me. If there really was something we needed to avoid in the road, my observational abilities certainly didn't tell me. As to the electrical fire I spotted on my way back from the garage, we live in a safe neighborhood and there's no reasonable explanation for why I would have to check on the garage lock, so I wouldn't have seen the fire if I hadn't felt certain I needed to go outside. And finally, when my husband was sick, everything the scientific method told me was that he had less than a 10% chance of survival. So it certainly didn't help me cope – though the same scientific method was absolutely responsible for eventually saving his life.

I love the scientific method, and I am grateful for it. I am also confident in the importance of noetic experience. So I now use the scientific method to investigate the physiological nature of intuition and noetic experience (e.g., Mossbridge, Tressoldi, and Utts, 2012). I have learned that a first-hand experience of inner wisdom is not only commonplace, it can be accurate. But my purpose here is not to argue the accuracy of intuition. Intuition can be, at times, grossly inaccurate. I don't recommend making any choice based on intuition alone, unless intuition is the only decision-making method available.

My purpose here is to explicitly state the incontrovertible fact that whether the experience of inner knowing is accurate or not, an initial noetic experience is the original seed for most if not all of those who have followed a path towards transcendence. This path leads

towards an experience that not only benefits each individual on a physical and psychological level, it also creates pro-social, compassionate feelings as a result of the insights that arise on the path. As a result, it seems to me that we ought to do what we can to facilitate the path to transcendence.

### **A research-based model of the path to transcendence**

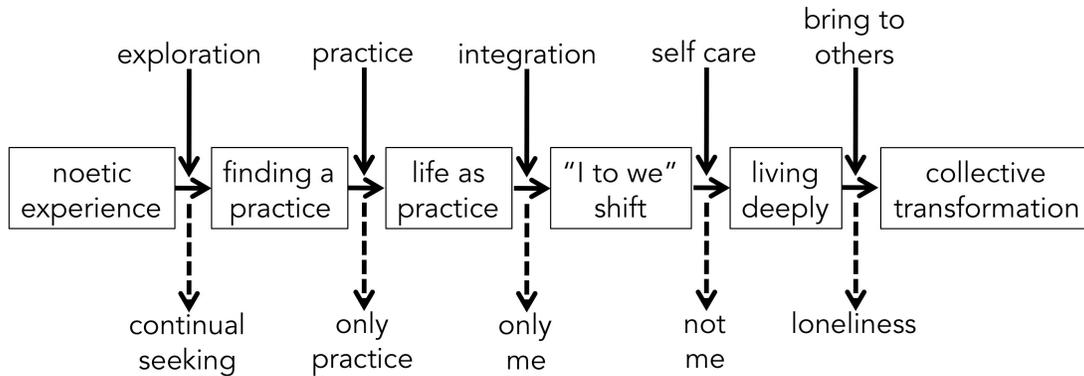
But what is the path to transcendence? How can we facilitate it if it is so personal and subjective? It turns out that scientists at the Institute of Noetic Sciences, a research-based think-tank focused on transcendence, have been working for more than ten years to answer exactly this question. They analyzed narratives written by individuals who reported high levels of transcendence, interviewed focus groups, performed intensive interviews with 60 indigenous and modern transcendence seekers, and they coded and analyzed surveys about life changes, transformation, and transcendence from more than 900 people (Schlitz, Vieten, & Amorok, 2008; Vieten, 2009). They point out that almost all of their data came from Western individuals and therefore lack universality. But their results are at least applicable to those of us in Western culture. Although their work is still continuing, by this point the common threads in their data are clear enough that they have proposed a model for consciousness transformation based on these common threads. The model outlines common steps toward “living deeply” or what I am calling full transcendence (Vieten, 2009), and points out several pitfalls along the way that can derail progress on this path and produce problems in the life of the experiencer.

I have adapted this model (Figure 1) for our use in exploring the Transcendence Tech space. Each step has been reported across multiple participants, along with the actions that support each step (words at the top of the model) and the potential pitfalls of each step (words at the bottom of the model). The model was originally shown in a spiral pattern to indicate that steps can be taken more than once and in different areas of one’s life at different times, and that the path continues to inform and enlighten each time it is taken. But for our purposes, I have linearized the steps so it is easier to see the facilitators and pitfalls. Ideally, a piece of Transcendence Tech should be designed to support at least one of these steps and also to prevent the pitfall associated with that step.

In the sections below, I will describe each of the steps in this model and highlight existing Transcendence Tech related to each step. After reading the tables below and the description of the steps, it will become clear that certain types of tools could be useful in more than one step. Nonetheless, I associate each tool with just one step to which it seems most pertinent. Also please note that in general I do not include examples of tech that are primarily focused on facilitating religious worship, so that most of these tools are accessible to secular users as well as religious users of all stripes.

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**Figure 1.** Schematic of a research-based model of the path to full transcendence or living deeply (model adapted from Schlitz, Vieten, & Amorok, 2008 and Vieten, 2009). Boxes represent steps on the path. Items above the boxes represent actions or experiences facilitating transitions between steps. Items below the boxes represent pitfalls that de-rail the progress of the path.

### Step 1: Seeding noetic experience with Transcendence Tech

The path towards transcendence is seeded by a noetic experience: an experience of receiving information in some way other than the traditional sensory or logical means. Although the experience can be initially denied or thought to be crazy, if we eventually accept the experience itself and its aftermath, the experience alters our worldviews and we are on the path to transcendence. This acceptance does not mean that we discard our logical capacities, just that we now have one more tool in our tool chests for understanding the world and making decisions.

Transcendence Tech can seed the path to living deeply by offering noetic experience to its users. Users may or may not experience profound changes in worldview, although that is the goal of designers. In all cases, users will learn something about the relationship between their conscious mind, their unconscious mind, and the physical world. In some cases, this can induce impactful noetic experiences that launch users on the path. Some notable examples are described in Table 2.

**Table 2.** Examples of Transcendence Tech that can seed noetic experience; note that this is *not* an exhaustive list. Full disclosure: the author is the creator of Choice Compass (see *A case study in Transcendence Tech design*, below). The information in “the what is it?” and “what is it like?” columns is derived from the website and/or personal experience of the author, and is therefore subject to bias. The question-mark symbol (?) marks technologies that use electricity or magnetism to stimulate the body or brain in ways that have not yet been fully tested for safety in clinical trials.

tech	what is it?	what is it like?	website
Biotronesis	womb-like art object entered by a group of users	experience a mild group psychedelic experience without requiring drugs; flashing lights, pulsing music and warm, cozy environment provide	biotronesis.com
Choice Compass	smartphone app that taps into heart activity patterns related to intuition	learn about body wisdom and intuition while you meditate on life choices	choicecompass.com
Shakti ?	headgear that creates a dynamic magnetic field	stimulate your brain and perhaps produce improved meditation and intuition, a sense of the sacred	shaktitechnology.com
Neurodreamer lucid dreaming mask	sleep mask that plays music to help you sleep and offers cues during dreaming	listen to music with embedded binaural beats and phase-modulated sounds that entrain your brain to sleep; lights remind you when you are asleep so you can play in your dreams	cornfieldelectronics.com
Psiforms	art form that illustrated the link between mind and matter	concentrate on an intention during your scheduled time of “entanglement” with a random-number generator and receive a work of art that correlates with your intention	psiart.net
Spatial-Angle Modulation	brain entrainment method using sounds that can keep creativity on track	listen to a peaceful soundscape that is correlated with focused, intuitive insight; offers advantages over simpler nature soundscapes	monroeinstitute.org
Soundself	art form/game that transforms the human voice into a melodic	sing into your computer’s microphone and listen to sounds that change with your	soundselfgame.com

	chant	voice, producing a sense of connection	
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## Step 2: Finding a practice using Transcendence Tech

Once noetic experience is appreciated as a valuable adjunct to logical and deliberative thought, the path is underway. We enter a time of exploration. During this exploration, everyday events are re-framed within the new worldview. There is a search for a practice that will offer a safe and sustainable way of exploring, reinforcing, and honing noetic experience on a daily basis. Sampling of multiple practices is part of this journey, but one extremely common pitfall at this stage of the path is to continually explore experiences, never diligently choosing a practice to, well, practice. There can also be a desire to “amp up” an initial experience or attempt to find the “perfect” practice that mimics our initial noetic experience. Most of this is not beneficial. Much of it stems from a habit of trying to control when and how the next step on the path appears. What the research suggests, instead, is that once a safe and sustainable practice has been found, what is beneficial is *to do the practice*. Doing the practice will lead to the next step, in the time that it takes.

Tools that help people sample safe and sustainable practices are plentiful, and a smattering of them are listed in Table 3, with safety caveats for those using electrical or magnetic stimulation. In particular, new meditation apps become available every day. It appears that none of the current tools help users avoid the pitfall of continual exploration.

**Table 3.** Examples of Transcendence Tech that allows users to sample potentially safe and sustainable practices that produce noetic experience consistently; note that this is *not* an exhaustive list. The information in “the what is it?” and “what is it like?” columns is derived from the website and/or personal experience of the author, and is therefore subject to bias. The question-mark symbol (?) marks technologies that use electricity or magnetism to stimulate the body or brain in ways that have not yet been fully tested for safety in clinical trials.

tech	what is it?	what is it like?	website
BodySound ?	magnetic field and sound pulsation through a reclined chair	experience being vibrated by the magnetic field at the base of the seat while music vibrates the rest of the chair; relaxing, rejuvenating, meditative	thobodysoundchair.com
Sunlight	meditation habit-creation app with optional EEG neurofeedback	watch soothing, earthy graphics show an animated plant growing as you meditate; if you meditate for	brainbot.me

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		21 days, your habit is set and your plant is full	
Buddhify	meditation app with guidance and mood-tracking	pick an activity from a colorful wheel; listen to guided meditations for everything from walking around doing errands to working on the internet; also asks for quick mood state ratings so you can see how meditation changes your moods	buddhify.com
Emindful	web-based mindfulness workout club	pay a membership to get community, classes, games, and apps designed to support mindfulness	emindful.com
Emwave	heart-tracking biofeedback device and desktop software supporting well-being	put on the ear clip to sense heartbeat, use graphs or games to learn how to get your heart activity in the range of optimal heart-rate variability	heartmath.com
Headspace	app-based mindfulness personal training	enjoy friendly and clear graphics and instructions with great voice; subscription gets you community and meditations for specific purposes	headspace.com

### **Step 3: Life as a practice supported by Transcendence Tech**

After a practice is adopted and performed consistently, at some point, the experience shifts to one in which the practice overflows the boundaries of its particular time of day and inserts itself into daily life. At this point, a person finds that they are now on step three of the path to transcendence. This step is called “life as practice” – when our daily experience of what it is to be alive begins to shift, affecting everything from what we do at work to how we speak to others we love. It’s a joyful and exciting time in which we recognize the fruit of our practice, and begin to think about exactly with whom we want to share this path. This step can also be called “self-actualization,” in that we are more often than not answering the question “Why am I here?” with our life choices, using our practices as the tool for this integration.

The major pitfall to be aware of at this step is that we can come to the false conclusion that we are the only ones who matter. “My practice is the greatest, and now it’s even integrated into the rest of my life! Everyone else should be doing this!” We might begin

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to feel that our own well-being is the only thing that matters, and that our own progress and practice is the be-all and end-all. We can mistakenly shut our ears to the ideas of others, or we can annoyingly foist our practices on others. But progress on the path to transcendence requires that we do not fall for these tricks of our ego. It requires instead that once we find our lives becoming outgrowths of our practices, that we allow this continued integration and observe what happens.

The Transcendence Tech tools highlighted in Table 4 seem designed to support this process of integration. Several of them, like Buddha Pong, HeartSynch and Vital Threads, help users avoid at least a portion of the dangerous pitfall of making it “all about me.”

**Table 4.** Examples of Transcendence Tech that can help users integrate practice into daily life; note that this is *not* an exhaustive list. The information in “the what is it?” and “what is it like?” columns is derived from the website and/or personal experience of the author, and is therefore subject to bias.

tech	what is it?	what is it like?	website
Buddha Pong	smartphone app for two-way mindfulness	after finding a partner in the waiting room, be connected over the phone to your partner for a brief single-word pong-like meditation	kennethfolkdharma.com/mindfullabs/buddhapong
Heart-felt apparel	biofeedback apparel	show everyone your ongoing heart beat; increases connection and self-awareness	produceconsumerobot.com/heartfeltapparel/
HeartSynch	art that reflects and guides the physiology of the group	watch engaging visuals timed to bring you and a group of users into greater coherence using heartbeat sensors	biofluent.com
Spire	sensor that coaches you on deep breathing	snap the sensor on your waistline and used throughout the day; experience de-stressing and flow via feedback about your breathing	spire.io

#### Step 4: “I to We” shift facilitated by Transcendence Tech

At some point, we move into a phase in which we get more and more focused on the well-being of our families, communities, nations, and the world. We move to a place of self-transcendence in which we begin to seek out work, charity, and volunteer activities that help make positive changes in the world. This is the “I to We” shift, and when we experience it, we are on step four on the path to living deeply, or full transcendence.

In addition to the actions we feel compelled to do for the good of others in this step, a necessary action associated with this shift in focus is self-care, because the most common pitfall of this step is to become immersed in a unity experience and forget to care for ourselves. If we erroneously decide there is no “me” in “we,” there is trouble. If we make this mis-step, we can end up with a cult-like mentality (Vieten, 2009). On the other hand, if we remind ourselves that we ourselves are included in our own efforts to make the world a better place, we can do a lot of good *and* benefit physiologically and psychologically from doing it.

Transcendence Tech that facilitates the “I to We” shift is, at this point, primarily focused on caring for others (Table 4) rather than necessarily reminding us to care for ourselves. However, it is also the case that caring for others can lead to eudaimonic joy – feelings of personal satisfaction and pleasure in the experience of engaging in meaningful activity. Some of the “I to We” shift tools may undermine this satisfaction by offering seemingly egoic points or rewards for helping others, although these awards and points can also feel like a positive boost at times. What is missing here are tools providing structure for people who want to create their own social transformation movement. However, as more people move on to the “I to We” step, such tools are more likely to crop up.

**Table 5.** Examples of Transcendence Tech that can support users who have made the transition from focusing on “I” to “we” and are searching for ways to positively impact the world; note that this is *not* an exhaustive list. The information in “the what is it?” and “what is it like?” columns is derived from the website and/or personal experience of the author, and is therefore subject to bias.

tech	what is it?	what is it like?	website
Charity Miles	app makes anyone a sponsored athlete, for charity	download the app, choose a charity; the app tracks your walking/running/biking miles through the pace-tracker and then corporate sponsors give per-mile donations to your charity	charitymiles.org
Do As One	app and website help	enter a breathing room,	doasone.com

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	people around the world breathe together	meditation room, or a color breathing room with guided meditations; if others are in the room, your breathing is synchronized with them	
Experiment	web-based crowd-funding tool focused on scientific experiments	search for an experiment in a field of interest, read lab notes from the experimenters, and fund one or more experiments	experiment.com
Feedie	app allows you to enjoy eating out at nice restaurants while also helping feed the hungry	take a picture of your fancy meal at a participating restaurant, send it to friends, and the restaurant will donate a meal to the Lunchbox Fund for hungry children in South Africa	wethefeedies.com
GiveGab	smartphone app supporting non-profit agencies	find a non-profit that suits your passion, look for volunteer opportunities or donate, get rewards and share with friends	givegab.com
Heart-Mind Online	web-based scientifically vetted resources for helping children learn emotional and social intelligence	access articles written by experts on child education and psychology and can get ideas for activities to help kids practice compassion	heartmindonline.org
Impossible	web-based gift-economy community connecting people who need goods and services and those who can provide them	users sign up and provide a profile of their skills, then receive emails from others who can use their skills; win thanks for giving your services	impossible.com
One Today	website and app making it easy to give a dollar a day to vetted charities	choose your causes, get prompts and notifications of matching grants; the app consolidates your gifts and you pay all together whenever you're ready	onetoday.google.com
Pay it Forward	foundation and app facilitating passing good works on to others	start a pay it forward chain in honor of your birthday or special event; save lives or simply put a smile on	payitforward.foundation

		someone’s face; reminds you to share good fortune; NOTE: some charitable donations are toward religious conversion	
Peacemaker	game in which you try to solve the Israeli/Palestinian conflict	“play the news” as events unfold in the region, discover how you as the Palestinian or Israeli leader would respond; learn compromise and perspective taking	peacemakergame.com

**Step 5: Living deeply alongside Transcendence Tech**

This step is the one I refer to as “full transcendence.” “Once that sweet dance between self-actualization and self-transcendence, formal and informal practice, and receiving and giving comes more naturally, people report an experience of existence that we call ‘living deeply’” (Vieten, 2009, p. 33). When we are in touch with full transcendence, we are present in the moment, full of compassion and awe. We are not separating ourselves or removing ourselves from anything, but instead we are joining with a broader and more compassionate sense of what it means to be alive. We accept what is happening while simultaneously hoping to do what we can to change things for the better.

There is, at this step, a feeling of wanting to connect with others who are with us on the path and to share our new insights and wisdom, with the eventual outcome of collective transformation (see below). This feeling of wanting to connect and share also highlights the potential pitfall of step five, which is retreating into unfortunate isolation. We can live deeply, experience awe, compassion, and equanimity – and yet also experience stark loneliness if we see that we have few partners with which to connect and share.

Transcendence Technology tools could potentially support us when we are experiencing full transcendence and want to connect and share with others on the path. Some examples are offered in Table 3. Note that some of these technologies have already begun to contribute to collective transformation. For example, the dreams registered in a dream database called DreamsCould have been analyzed for the relationship between dreams about breast cancer and actual diagnosis. The results indicate that women dreaming of breast cancer, specifically about tumors, are more likely than others to be diagnosed with the disease (Burk, 2015). To take another example, StoryCorps’ Griot Initiative is the largest collection of African American stories in history; they also launched a National Day of Listening in the United States (<https://storycorps.org/about/>).

**Table 6.** Examples of Transcendence Tech that can support users in connecting and sharing themselves when in state of full transcendence or living deeply; note that this is

*not* an exhaustive list. The information in “the what is it?” and “what is it like?” columns is derived from the website and/or personal experience of the author, and is therefore subject to bias.

tech	what is it?	what is it like?	website
DreamsCloud	website and app supporting sharing dreams and insights	share your dream by typing it or dictating it; choose keywords matching your dream by pictures;	dreamscloud.com
InsightShare	website providing participatory video services and an app to record experiences and insights from people around the world	learn to record compelling video in your community to get an idea out into the world; gives a voice to your community	insightshare.org
Machine to Be Another	virtual reality performance piece facilitating connection with others	wear a VR headset that shows them images from a performer’s point of view; working in agreement with the performer, users explore the performers’ experience and begin to feel as if they are the other	themachinetobeanother.org
Presencing	website offering online tools, courses, and community related to the foundations of leadership and community	learn the basics of profound leadership through online courses, use hubs to connect with others interested in shifting the way communities work in your area	presencing.com
StoryCorps	app and physical story booths recording stories and insights from people around the world	make an appointment online for a story booth or use the app to answer specific questions like “what is the most important lesson in your life?”	storycorps.com

**The perpetual step: Collective transformation supported by Transcendence Tech**

Instead of the sixth step, I call this last one the “perpetual step.” No one enters full transcendence and stays there all the time. We all need to be involved in a transformative community that perpetually supports us in living more completely through each of the first five steps.

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Once we taste full transcendence, we find ourselves wanting to make the world safe for everyone to experience it – including creating a world in which we find ourselves spending more and more time living deeply. Living deeply naturally evolves into this collective transformation, which reflexively supports living deeply.

The task here is to keep using whatever tools have helped us during each step on the path. For designers, the task is to build and test new tools, technological or otherwise, that support collective transformation by virtue of facilitating all five of the earlier steps on the path and avoiding the common pitfalls associated with each.

### **A case study in Transcendence Tech design**

As an experimental psychologist interested in the unconscious processing of emotions and perceptions, I had stumbled upon the work of the Heartmath Institute ([heartmath.org](http://heartmath.org)) about a decade ago. I read with interest their extensive research that established a clear relationship between heart rhythms and emotional states. Stress, anger and fear produced what they called an *incoherent* heart rhythm. Joy, appreciation and deep happiness produced a *coherent* heart rhythm.

Having received my Ph.D. in the psychology of sound perception, this contrast between incoherence and coherence made sense to me. The difference between incoherent and coherent heart rhythms is the same as the difference between a noisy, unpredictable sound and a pure tone. A noisy, unpredictable sound is incoherent because it does not produce the same frequency over time, but a pure tone is coherent – over time it has the same frequency. So when we are joyful, appreciative and in deep happiness, our heartbeats tend to change their rhythms consistently over time. It's as if our hearts sing more beautifully when we are in a state of gratitude and joy. In a way, this result is not surprising, given the thousands of years in which humans have referred to our hearts as the centers of our emotional lives.

After talking with the science team at Heartmath and purchasing the Emwave coherence training program, it was clear to me based on my experiments with a group of adult participants and myself that the experience of having a coherent heart rhythm is very different, and much more enjoyable, than the experience of having an incoherent heart rhythm. I found I could train myself to make my heart rhythm more coherent, which had the effect of making me happier and more appreciative.

Becoming more sensitive to my heart rhythms made me aware of another phenomenon: when I thought about life choices that concerned me, my heart would go out of coherence. Around the same time I was noticing this, I was reading about “unconscious thought theory,” which is the theory that unconscious processes are sometimes better at solving complex tasks than conscious processes are (e.g., Strick et al., 2011). This sentiment was echoed in a quote from Freud reported by one of his students. The student had asked for

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advice about a personal decision, and Freud said, “When making a decision of minor importance, I have always found it advantageous to consider all the pros and cons. In vital matters however ... the decision should come from the unconscious, from somewhere within ourselves” (Reik, 1948/1998, p.vii).

I started to think about the value of getting feedback on our life choices from our heart rhythms; it seemed to me that this would be a sort of “short-circuit” to our unconscious wisdom. My idea was to build an app that would compare two complex and contrasting life choices, like “leaving mainstream academia” versus “trying to find a tenure-track position.” I knew that the available biofeedback tools, some of which I have already briefly discussed, were seemingly locked into a training mode. This was valuable for the purposes they served – training oneself to be less stressed, more attentive, productive, and happier. But I wanted to users to be able to query the data themselves. To use one’s own body as a compass for life direction. So I set out to create a “Choice Compass.”

At first I assumed I was simply going to look for coherent versus incoherent heart rhythms when participants meditated on their choices. I knew I didn’t want users to have to buy any particular sensors. I felt that they should be able to use their phones to detect heart rhythms. There was no open-source rhythm-detection code available, so I worked with a talented coder (David Micksch at Seazel Design) to build one. We used input from the built-in camera; as a user placed her finger over it, there are changes in finger color over time that allowed us to extrapolate the timing of the heart rhythms. To do the analysis I required, I needed the timing of each individual heartbeat, so the algorithm had to be precise. Together, through trial and error, we discovered an optimal detection algorithm.

The next step was to test the idea that coherent and incoherent rhythms were truly associated with good and poor life choices. Over a year I tested more than 500 participants to determine whether this hunch was correct. The test I used was based on an experimental psychology trick: mood induction. I created simple contrasting videos featuring life choices that were obviously positive versus those that were obviously negative. For instance, positive choices included, “I choose to feel healthy, I choose to bravely follow my path,” while negative choices included, “I choose to feel miserable, I choose to stay in a rut.” I instructed participants to view each of these videos while they put their finger over the camera on their phone and I collected their heart rhythms over the internet.

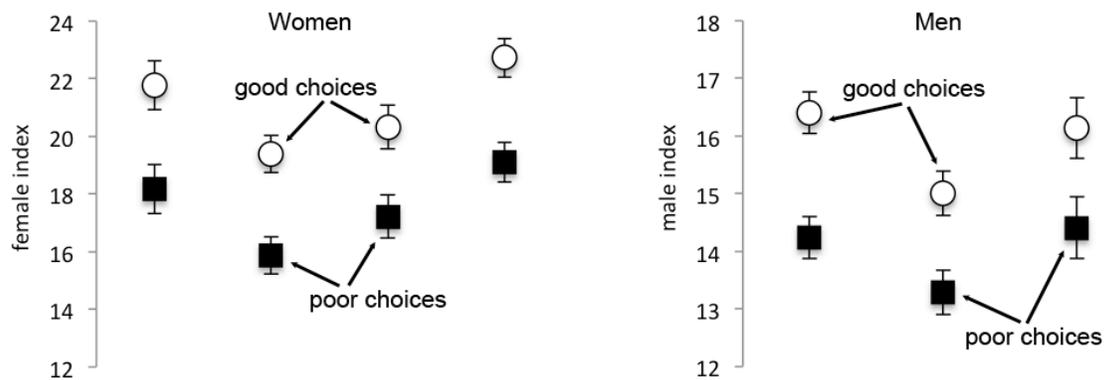
After analyzing the data obtained in the first two experiments, I found two surprises: 1) coherence and incoherence as traditionally defined do not seem to differentiate positive from negative choices consistently, and 2) the mathematical regularities in heart rhythms that *do* differentiate positive from negative choices are almost entirely opposed between genders, on average. I will explain both of these surprising results below, in an effort to warn future Transcendence Technology developers to test their assumptions rigorously before releasing their work into the wild.

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Because I wanted to make sure that the videos were brief enough to keep people engaged in the content, I wanted them to be at most a minute long. I knew that non-meditators have difficulty focusing on a single topic for more than 15 seconds or so, so I figured a minute would be a nice challenge for them, but not too challenging. As a result, I did not gather enough heartbeat data to do a traditional coherence versus incoherence (or *heart-rate variability* [HRV]) analysis. So I probably should not have been surprised that the state of heartbeat coherence was not consistently related to the positive versus negative status of the video the participants were watching. As a result of this surprise that shouldn't have been a surprise, I decided to go "fishing" – my original hypothesis was incorrect, so now my goal changed to see whether there were any mathematical regularities in the heart rhythms that *could* differentiate the positive from negative choice videos.

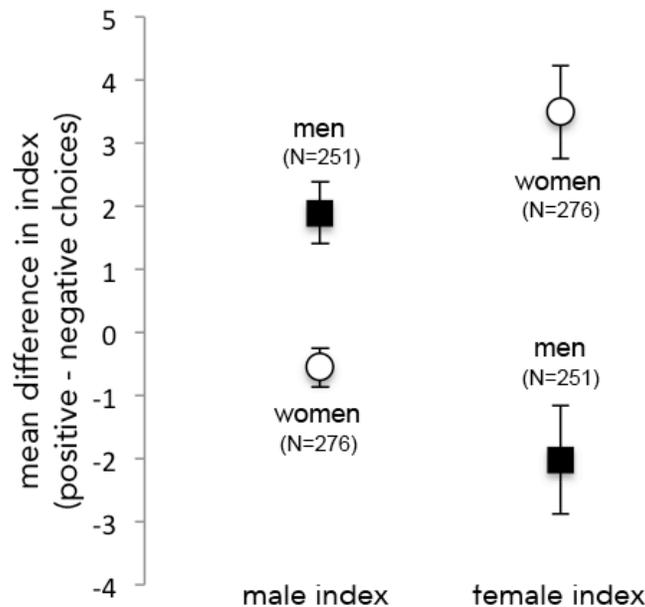
I did find some unexpected regularities, and they seemed to be consistent across the first two experiments. They also seemed to be dependent on the gender reported by the participants. I had instructed participants to choose the gender with which they felt most aligned. Participants who chose "female" or "woman" as their gender showed a different set of mathematical regularities than those who chose "male" or "man" as their gender. So I decided to create two "indices" – one index for self-categorized women (the "female" index), and the other for self-categorized men (the "male" index). I performed another experiment and found that these indices could be improved a bit, but the gender difference still remained. By the time I completed my fourth experiment, it became clear that the indices were independently statistically reliable (see Figure 2).



**Figure 2.** Means of the "female" heart rhythm index for self-categorized women (left) and of the "male" heart rhythm index for self-categorized men (right) while viewing videos suggesting good choices (open circles) and while viewing videos suggesting poor choices (filled squares). Error bars show +/- one standard error of the mean within participants. Each set of good and poor choices represents one experiment; for men, the final two experiments were combined into one (showing three experiments for men)

because not enough men participated in the third experiment. A total of 276 women and 251 men were tested across these experiments. All experiments reached statistical significance for the indices compared between good and poor choices.

Interestingly, the indices were directly opposed between the genders. In other words, self-categorized women were showing mathematical regularities in heart rhythms while they watched the positive-choice videos, and these regularities were directly opposed to those that men were showing while watching the same videos (see Figure 3). This result can be understood by imagining that I had found that when self-categorized women get happy their heart rhythms go up while when self-categorized men get happy their heart rhythms go down. This is not what I found – what I found was more mathematically complex, but conceptually it's a similar idea. As a result of this discovery, I decided that Choice Compass would ask participants to identify their gender, so that we could use the appropriate algorithm to relate choices to heart rhythms. Otherwise, the app would not perform well.



**Figure 3.** Grand mean difference across all experiments in the mathematical index for good (positive) minus poor (negative) choices, shown for the male index (left) and the female index (right) as it applies to self-categorized men (filled squares) and women (empty circles). Error bars show +/- one standard error of the mean between participants. These differences are statistically significant, indicating that self-categorized men and women show opposing heart rhythm patterns when watching videos about positive and negative choices.

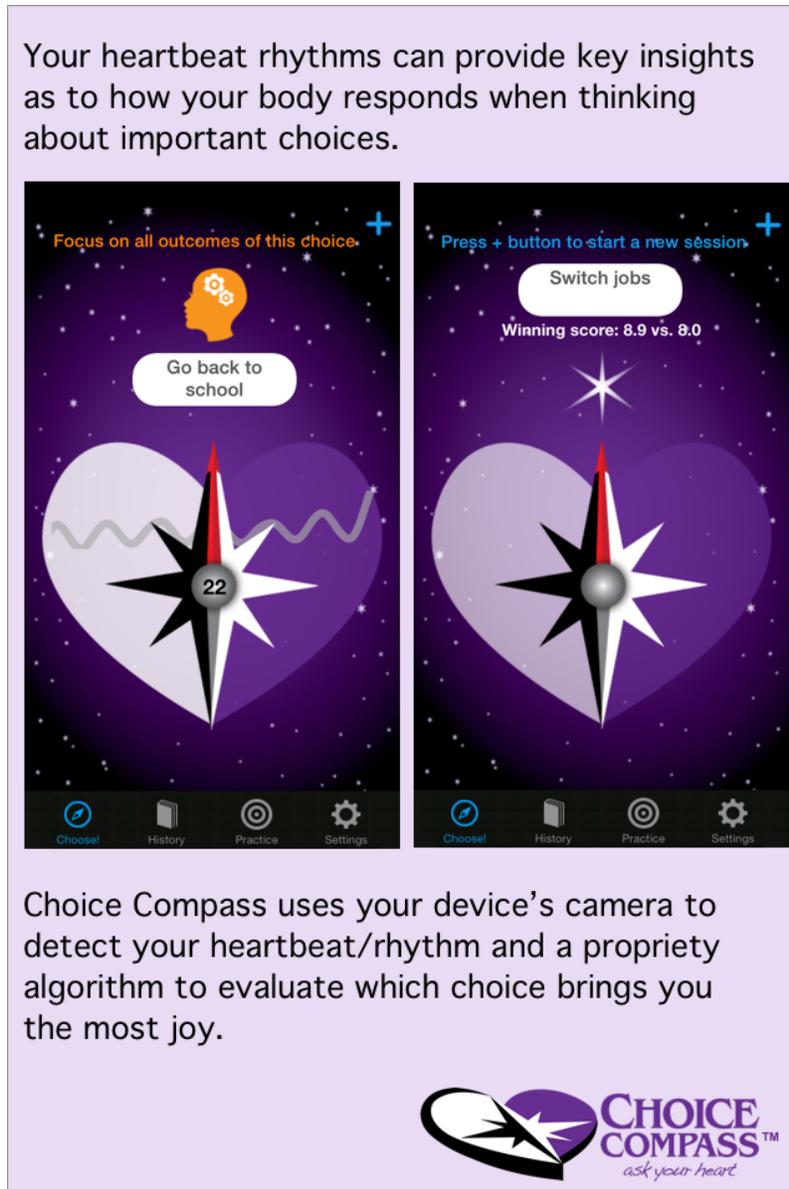
After releasing the app with the gender-specific algorithms, I again learned something

critical: the so-called “gender difference” may depend on hormonal state. In other words, after receiving more than 10 emails from post-menopausal women saying that the “female” index always gave them the same answer, but it didn’t “feel” right, it occurred to me that what I had originally suspected were socially constructed gender differences might instead be biologically constructed. After reading a bit about the influence of progesterone on heart rate variability, I decided this is likely the most reasonable explanation of the difference experienced by these women. While most women who tried the app were under 40, I wanted Choice Compass to be useful for all women. Further, I noticed that men who meditated regularly tended to get more accurate results with the “female” index. As a result of these discoveries, it appeared to me that I needed to entirely let go of the idea of introducing a gender-specific algorithm. So I am working on a new version of the app that asks each participant to calibrate Choice Compass to her or his own heart rhythms as they think of positive and negative choices. This will allow each user to be confident that the algorithm represents the correct relationship between their own heart rhythms and their own mood during making a choice comparison.

Finally, in the process of creating Choice Compass, I learned that education of the user is critical. Not in terms of the tutorial that comes with the app and instructs the user about how to use it well; this is critical for any technology. But in the case of Choice Compass, here was an entirely new technology that filled a niche that most potential users didn’t know existed. Many users did not know that: 1) their heart rhythms could be picked up by their phone’s built-in camera, 2) their heart rhythms were related to mood, and 3) that meditating on one choice at a time and not flipping to thinking about the contrasting choice could actually help them make better choices. The marketing images I used in the Apple were designed to communicate all of that information (see Figure 4).

I am still working on improving Choice Compass, but I have learned that it is valuable to its users for two main reasons. The first most common piece of feedback that I have received is that the users already know their best choice, but Choice Compass acts as a validation tool. The second most common statement is that because it’s hard to get the heartbeat detector to work without stopping everything else you are doing, Choice Compass supports people in fully concentrating on one choice at a time. People report that even before the compass needle points to the “winning” choice above the image of the North star on the app, they have made their decision.

This is a successful outcome for a piece of Transcendence Tech, because it has created a situation in which people can consistently access a noetic experience – an experience that some part of them has wisdom, through the “back end” of the unconscious mind (Figure 1, step 1). The still, quiet voice can be heard in many ways, including this particular short-circuit to our body wisdom.



**Figure 4.** A marketing image for Choice Compass containing screen shots of the app. The image was designed to educate the users about the possibility that this particular piece of Transcendence Tech could actually work.

### **Strengths and weaknesses of Transcendence Tech**

The greatest strength of Transcendence Tech is that, used as structure to organize the field, the ideas informing Transcendence Tech address the human need to feel united with that which is within us and moves beyond us. A secondary strength of Transcendence Tech is that it has the potential to offer wayfinding tools on a path to transformation that

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has been discovered via research as opposed to personal belief. In so doing, Transcendence Tech both validates a need that has been considered taboo in some scientific and tech circles and simultaneously uses scientific and technological principles to fulfill this need. To the extent that designers can create tech with both of these strengths in mind, these tools will contribute to the goal of worldwide transcendence, which will offer new possibilities for humanity that are currently difficult to imagine. But let's try. Here are a few scenarios.

It's morning in the Western Hemisphere. Time to prepare for learning. Students of all ages sit in simultaneous meditation for 20 minutes, breathing in synchrony as they listen to a song created from their own brainwaves. When they hear staccato high pitches, they know they need to collectively relax and focus on joy. When they hear long, low drones, they know that they need to collectively wake up and focus on the tasks for the day. After this meditation session, personalized communications link two to five students for their morning learning groups who are most complementary, in terms of their neural patterns during the meditation. The topic this morning is "Understanding mental effort." It covers the sciences of psychology, neuroscience, and intention. In the lab portion of the coursework, students are learning to focus their intention for peace and kindness on all sleeping students in the Eastern Hemisphere. Tonight, their partners in the East will do the same for them, and they will compare notes the following morning.

Shawna is not doing well today. Something's off – she's not sure what it is. Her Phys Readout, which gives her easy access to all her physiological information, says everything should be fine. Her dopamine and serotonin levels have never been better. But yuck – nothing seems good. After breakfast, she asks for a suggestion from her Path app. It reminds her that the greatest pitfall she faces right now is loneliness – she needs to keep bringing her insights to the community to remain in her state of living deeply. "Oh, yeah!" Of course. She almost forgot that she scheduled another meeting of her Living Deeply circle for this afternoon, facilitated by her Path app. That'll keep her in touch with others on the path.

Steve wakes up from a deep sleep. He remembers a very specific dream about a terrorist attack. Before getting out of bed, Steve speaks his dream into the Dream Transcription app. Within minutes, he finds out that seven other people in his area had similar dreams. A silver alert is sent out to his community to indicate a shared dream-based prediction; now everyone will see that they need to be extra careful today. Steve exhales deeply. He remembers when these dreams used to be called coincidences, and people did not act on the information. How many lives were lost? He feels lucky to be part of the Dream Team, comprised of precognitive dreamers like him. Steve feels like a superhero, and in a way, he is one.

Several weaknesses in Transcendence Tech need to be addressed so that Transcendence Tech can move toward these and other exciting visions for humanity. The most obvious weakness is that almost all of these tools are created without awareness of what step on

the path to transcendence they address. This is likely because few designers are aware that there is research-based analysis of this path from which they could draw. Part of the purpose of the present chapter is to remedy this problem. If more designers knew they were creating Transcendence Tech and were clear about what step or steps their tools would support, their ability to target appropriate users and help users avoid common pitfalls would be much improved. Additional tools that support the next steps for each form of Transcendence Tech would become obvious. And inter-relationships between communities of users would be easier to build, as each tool designer would, through understanding the path, have an eye toward bringing together users who are on the same steps in the path.

Another weakness in the Transcendence Tech space is that many of the tools are not scientifically tested with the path to transcendence in mind. In other words, a particular meditation app may have been shown to make people more focused and relaxed. But it is not clear whether using that app will lead to the same kind of “life as practice” shift that regular meditation will produce. Again, this problem occurs because of the lack of awareness of the scientific reliability of the path to transcendence. Once tool creators become aware of this path, a natural outgrowth will be to determine whether tech made to support the path actually succeeds. Until then, word of mouth and trial and error will have to do.

A third weakness is the susceptibility of Transcendence Tech to dogma. Any tech space related at all to mystical insight has the problem that a dogmatic community, religious or otherwise, can co-opt the space and argue that participants can only reach transcendence through their methods. The remedy for this problem is education: *The path to transcendence was discovered by looking at commonalities in reports of individuals across all religious traditions*. So by definition, it is not the case that only one dogmatic path leads to transcendence. In fact, it is clear that each person must find the practice that works for her. This essential point must be made clear in the design for all Transcendence Tech tools.

A fourth weakness, and the last one I will discuss here, is that like most technology movements, Transcendence Tech does not generally address the sociological problems of technological overload (e.g., Kennedy, 2014). Interacting with technology can keep us away from other people, preventing us from fully engaging in several steps on the path to transcendence (i.e., “I to We,” “Living Deeply,” and “Collective Transformation”). Transcendence Tech designers must create tools that facilitate offline, real-world interactions with others.

## **Conclusions**

Transcendence Technology offers us an opportunity to bring to the world a new version of what it means to grow up and become an adult. Beyond self-actualization and joy, Transcendence Tech guides us to connect with others and with a sense of the sacred, and

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to gain insights about interdependence and unity. Through the use of well-designed Transcendence Technology, we can collectively transform our communities, one shared insight at a time.

This is clearly a utopian vision, but it is one built on science rather than the insights of any one person. The steps and pitfalls are clear and they are common across multiple lifestyles, religions, and life experiences. What is needed is clarity about the path, awareness of the pitfalls, and tech that uses this clarity and awareness to help bring us all along the way.

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