

# Journal of • Virtual Worlds Research

[jvwresearch.org](http://jvwresearch.org) ISSN: 1941-8477

## Assembled 2018

Part 2

August 2018 Volume 11 No. 2

Art by: Gerd Altmann • Freiburg/Deutschland

# Volume 11, Number 2 Assembled 2018 (Part 2)

## August 2018

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jvwresearch.org ISSN: 1941-8477

Volume 11, Number 2  
Assembled 2018 (Part 2)  
August 2018

## Dreaming the Virtual: How Lucid Dream Practice Can Inform VR Development

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### Abstract

Using the grounded theory method (GTM), this article proposes an “integral” model for studying the development and use of virtual and augmented reality (VR/AR) technologies. Integral models seek holistic understanding by combining third-person, empirical perspectives with first-person, subjective experience. Here, the proposed model provides a comparative analysis of immersive virtual reality (VR) platforms and the practice of lucid dreaming (maintaining conscious self-awareness while dreaming). Based on a discursive analysis of technologists’ statements about VR, and a review of literature on lucid dreaming, this article identifies a largely unexamined area of research. Indeed, the proposed model suggests that dream research is highly relevant to VR development as a catalyst for ethical critique of emerging commercial technologies. Though informed by Buddhist philosophy, this is primarily a secular approach based in moral-developmental psychology and contemplative studies. It constitutes an example of Contemplative Media Studies, which involves the application of contemplative practices and principles to the critical analysis of media technologies, content, and institutions.

## 1. Introduction

After Facebook's acquisition of Oculus VR and its Oculus Rift headset, Mark Zuckerberg (2014) praised the gadget in grandiose terms. "People who try it say it's different from anything they've ever experienced in their lives," he remarked, adding that it "opens up the possibility of completely new kinds of experiences." While similarly inflated rhetoric surrounded products such as iPhone, promotional discourse often frames VR devices as near-magical talismans poised to unleash previously-unknown dimensions of human imagination.

Yet practitioners of lucid dreaming argue that the realism of emerging virtual environments—though impressive—pales in comparison to the consciously-experienced dream. In a sense, the lucid dream (in which the dreamer knows he is dreaming) is the analogue predecessor of VR. It is as though processing power is beginning to emulate, in crude form, the imaginative depths that dream practitioners have experienced for millennia.

Research focusing on the connections between these areas (VR/AR and dream practice) is scant at best. This gap is unfortunate, given the wide range of benefits both areas offer—from psychotherapeutic to commercial-industrial applications. The primary purpose of this article, therefore, is to outline a theoretical framework for research that can fill this gap and thereby amplify these untapped personal and socio-economic benefits. The article's overarching research questions are thus: How do we ensure that ongoing VR development benefits the public good, even as it provides a healthy revenue stream for commercial developers? How do we ensure the digital economy does not merely augment the socio-economic privilege of some at the expense of others? In response, the article proposes an "integral" model that applies the insights of dream research and practice to the development and ethical critique of virtual environments.

The article proceeds as follows. First, the relevance of an integral model is outlined, focusing on the potential problems arising from unrestrained commercial development driven by profit-seeking and techno-utopian beliefs. Second, the grounded theory method (GTM) employed to develop the integral model is described. The method used here draws connections between two areas: a) the literature in scientific dream research and Buddhist dream practice; and b) contemporary discourse surrounding VR/AR technologies. One section is devoted to each of these two areas. The insights from these data feed into the resulting grounded theory (i.e. the proposed integral model), which is outlined in the following section with specific implications for interface design, platform architectures, user policies, and regulatory frameworks. The article concludes with proposals for future research.

## 2. Relevance and Significance

By addressing the gap described above, the proposed framework bridges two competing discourses with regard to VR/AR technologies. Public discussion of VR tends to polarize into one of two camps: cynicism and anxiety on one hand; utopianism and naiveté on the other. While these competing discourses are equally profitable at the movie box office, they do not advance a nuanced discussion of the benefits and challenges of VR development. Each poses a risk: fear and cynicism stifles innovation, while naiveté leads to imprudent choices whose ill-effects are difficult to address later on.

Of course, each extreme contains a grain of truth. On one hand, the ability to dream consciously is difficult to achieve and, as noted below, is sometimes regarded as a patently absurd proposition. When they arise at all, discussions of the practice often appear arcane or irrelevant to non-practitioners. This may explain the inflated rhetoric of commercial developers, as well as the utopian fantasies depicted in films such as *Transcendent Man* (2009). As long as lucid dreaming

remains inaccessible to all but a small minority of practitioners, VR does offer a radically new experience.

On the other hand, VR technologies do have the potential to amplify commercial media's tendency toward "propaganda"—a term which can refer not merely to rhetorical influence but to a broad sociological process that traps individuals within unjust techno-cultural systems (Ellul, 1965; Christians, 1990, 2006). The plausibility of such scenarios feeds the popularity of dystopian films from *The Matrix* (1999) to *Ready Player One* (2018).

Rather than waxing nostalgic for an imagined past, or rushing headlong into a hoped-for utopia, the challenge is to place digital and analogue in symbiotic dialogue. An integral model aims to harness potential benefits for individuals and, indeed, for the long-term sustainability of the digital economy. Unfortunately, the current state of discourse is imbalanced. As argued in previous work (see especially Healey 2013a) the prevailing winds now fill the sails of techno-utopianism, and therefore the greatest risks are those of imprudent development. The remainder of this section will address the significance of these risks.

To their credit, companies such as Google and Facebook already draw from contemplative traditions by offering employees a range of "corporate mindfulness" programs such as Search Inside Yourself and Wisdom 2.0. Yet such programs are implemented selectively, with the ironic effect of amplifying—rather than attenuating—the concerns related to digital media use. Consider, for example, Wallace's (2012) astute definition of mindfulness as "continuous attention to a chosen object, which requires that one remember what the task is and not become distracted by other phenomena" (p. 161). By this definition, the proliferation of corporate mindfulness programs is ironic, since the same companies aim to create platforms that mimic the "narcotic-like properties" of slot machines (Schulson, 2015). Marketers advise developers to "design for interruption," since users' disengagement is "the worst thing that can happen to a startup" (Alistair, 2012). A paradox has thus emerged: tech employees mindfully create platforms which undermine the mindfulness of users. Moreover, the digital economy has exacerbated economic inequality even as elites enjoy the benefits of stress-reduction training (Healey, 2015b; Purser, 2012, 2015).

In the context of VR development, commercial imperatives amplify this paradox of privilege. Facebook purchased Oculus for \$2 billion in 2014. Google offers Cardboard and Daydream. Samsung, Apple, and Microsoft are in the market. HTC Vive offers VR versions of Bjork's music videos. These platforms create vivid environments by tracking user behaviors in richer detail than is possible in conventional social media. By monitoring user interactions and body position, platforms make reasonable inferences about consumer preferences and even medical conditions. While such data creates highly personalized immersive environments, it is ripe for abuse insofar as advertising-based revenue models aim to influence users. Critics of VR voice concerns about the potential for "deep behavioral manipulation" for nefarious purposes (Madary & Metzinger, 2016, pp. 4-5). Additional problems arise if the market for commercial development becomes too highly concentrated and opaque. Designs, patents, and protocols may become "locked in," limiting the direction of future development. For example, VR pioneer Jaron Lanier worries that current platforms' focus on pointers, which allow manipulation of virtual objects, may limit the type of sensory experiences available to users (Wolverton, 2016).

This article argues that while such companies' interest in "mindfulness" is laudable as far as it goes, such organizations' commercial interests are ultimately at odds with the underlying ethical principles of contemplative practice. As Heidegger (1993/1977) claimed, "confrontation with [technology] must happen in a realm that is, on the one hand, akin to the essence of technology, and on the other, fundamentally different from it" (p. 19). In a sense the "original" form of virtual reality, dream yoga provides an ethical framework that is at once highly relevant to—yet radically different from—the technical, economic, and psychological dynamics of VR.

To be clear, the goal is not to replace VR, but to leverage the insights of contemplative practice to guide development in a more ethically sustainable direction. In fact, it has long been clear that VR holds great potential to treat social anxiety, autism, and post-traumatic stress (PTSD) (Sippel, 2013; Nelson, 2008). Not coincidentally, these are among the same disorders that researchers have begun to treat with lucid dreaming (Morin, 2015; Wen, 2014). Indeed, the public-good potential of VR development extends well beyond individual psychology: it is used by doctors in performing surgery; by teachers in offering educational content across great distances; by journalists in creating immersive coverage of news events (Steel, 2015). With her innovative Empathy Project, Jamie Wong demonstrates how VR can enhance understanding across socio-economic and racial differences (Peters, 2016). This type of work captures the spirit of the Buddhist emphasis on compassion, which is foundational to dream yoga. In summary, an integral model for research and development can help us not only to envision alternative approaches to VR design, but to transform the political-economic context in which development proceeds. What is at stake here is the long-term integrity of the digital economy. A model for integrating analogue and digital is necessary now more than ever.

### **3. Methodology**

This article provides a technology-specific application of an emerging framework known as Contemplative Media Studies, defined as “the application of contemplative practices and principles to the critical analysis of media technologies, content, and institutions” (Healey, 2015a). It applies principles from the Buddhist practice of dream yoga to VR/AR environments. The study uses the grounded theory method (GTM) to develop an integral model of scholarly critique and development for future research. The purpose of GTM is not to test hypotheses based on an existing theoretical framework. Instead it is to build a new framework (i.e. a grounded theory—here, an integral model for VR) upon which future hypotheses can be based (Bryant 2014, p. 120). A grounded theory is conceptually cogent, useful to both scholars and practitioners/developers, and productive of “explanations and insights that perhaps previously were unrecognized or implicit” (p. 121).

This article fulfills these criteria by identifying the gaps in literature described above and offering a path forward for addressing them. It builds upon previous research on the ethics of social media architectures, including especially, Healey and Potter’s (2017) critical discourse analysis of statements by Mark Zuckerberg, which reveals the latter executive’s rhetorical self-positioning as psychotherapist in relation to Facebook users. Since the premise of the current article is that few, if any, scholars or engineers are aware of the connections between VR and lucid dreaming or dream yoga, such data collection and analysis methods are not directly applicable. This project aims to identify not the specific content of a discourse, but the gaps within it—the absence of discussion where it should exist. Here GTM works iteratively to identify potential points of resonance (between literature on dreaming and public discourse about VR) where future research projects may be developed. Before outlining the model, the following section first provides an overview of Western-scientific and Buddhist understandings of lucid dreaming.

### **4. A Brief Review of Literature on Dreaming**

This section describes two sets of literature which demonstrate the relevance of dreaming to a range of personal and socio-political issues. The first focuses specifically on lucid dreaming, a phenomenon long understood within Buddhist philosophy as a component of dream yoga, and only more recently within Western-scientific research. The second includes contemporary social-science research, which employs dreaming primarily as a conceptual tool (a metaphor for understanding social issues). Together these sources underscore the applicability of dream research to contemporary socio-political issues, while providing over-arching ethical and philosophical principles directly relevant to the critical analysis of VR.

## 4.1. Lucid Dreaming and Dream Yoga

In 1913, Dutch psychiatrist Frederick van Eeden coined the term “lucid dream” to refer to the experience of conscious self-awareness while dreaming. The lucid dreamer can interact with dream characters, manipulate objects, and perform other normal tasks. But lucidity offers more imaginative control than waking life. With practice, any imaginable experience is possible: flying through the air, breathing under water, changing the shape of one’s body.

Dream lucidity is acknowledged by Western thinkers from Aristotle to St. Augustine (LaBerge, 1988, p.17). Nietzsche (2000/1886) recalls an experience in which “amid the dangers and terrors of the dream” he called out, “This is a dream! I want to dream on!” (pp. 20-21). According to Andreas-Salomé (2001), Nietzsche concluded that life “in its deepest essence is a dream whose spirit and meaning we must determine for ourselves as awakeners” (p. 145).

Yet the phenomenon is often overlooked in scientific research. Freud dismissed such dreams as wish fulfillment (Thompson, 2015, p. 147). Others denied their existence well into the late twentieth-century. Stephen LaBerge’s research broke this chain of skepticism by confirming the reality of lucid dreams and providing details about dream temporality and hemispheric brain activity during lucidity (LaBerge, 1985).

Buddhist philosophy includes a comprehensive understanding of lucid dreams as an aspect of spiritual practice. Wallace (2012) defines dream yoga as “a traditional practice within Tibetan Buddhism where dreams are used as a path to spiritual awakening” (p. 160). Practitioners articulate three main goals: first, flexibility of mind; second, the capacity to move beyond dualistic thought; third, an understanding of dreaming as preparation for death.

Mental flexibility takes many forms. Drawing from the Mother Tantra, a Buddhist text, Rinpoche (1998) describes eleven areas of flexibility, all of which focus on overcoming limitations of thought and perception. For example, the dreamer might “take a small, beautiful flower and make it as large as the sun”; or “when you are angry in a dream, change the emotion to love” (Rinpoche, 1998, pp. 123-124). The point is to move beyond rigid patterns of thought which “obscure wisdom and constrict experience, keep us ensnared in illusory identities” (Rinpoche, 1998, p. 120).

Such flexibility is tremendously useful in waking life. “Just as dream images can be transformed in dream,” Rinpoche suggests, “so emotional states and conceptual limitations can be transformed in waking life” (Rinpoche, 1998, p. 121). The achievement of non-dualistic awareness (where the subject-object distinction is transcended) is particularly important in relation to one’s preparation for death since “experiencing death is very similar to entering dream” (Rinpoche, 1998, pp. 139-140). This understanding contrasts with Greek and Judeo-Christian theologies, which preclude the very notion that we might understand the phenomenology of the death experience (Thompson, 2015, pp. 284-285).

Practitioners do not seek pleasurable experiences so much as the development of imagination, intention, and concentration. These skills allow practitioners to maintain equanimity in the face of uncertainty and fear, whether in dream-encounters with the unconscious mind or in waking-encounters with real threats. The lucid dreamer thus develops the capacity to distinguish unspoken assumptions about reality, understand the limitations they impose, and move beyond them with imagination.

These principles have collective implications. As Thompson (2015) notes, “dream yoga encourages us to view all waking events as dreamlike,” and in this sense it encourages us to “cultivate this critical mindfulness in waking life” (p. 189). In his discussion of the practice, Wallace (2012) likewise highlights the importance of vigilance and the maintenance of a “critical reflective attitude,” which he defines as “a questioning or skeptical attitude applied to mental phenomena” (p.

159). This attitude stands in direct contrast to dullness or laxity, which he defines as “a state where one’s attention is unfocused, hazy, and tending to drowsiness” (p. 160).

These principles are also relevant to critical media analysis. This article posits the notion of “dreaming the virtual” as an application of dream philosophy in three dimensions: the design of VR devices and platforms; the political-economic context in which VR technologies are developed; and the overarching cultural-ideological context in which digital culture unfolds. The aim of this framework is to envision a media environment that encourages both individual and collective mindfulness. In contrast to Silicon Valley’s individualistic applications, the term “civic mindfulness” highlights the social implications of contemplative practice—that is, a collective awareness within the body politic. The increasing immersive-ness of virtual environments makes the maintenance of such awareness a crucial capability. In this sense, mindfulness and lucidity are fundamentally related. Civic mindfulness is lucidity writ large.

## 4.2. Dreaming in Social-Science Research

Research in organizational theory includes both literal and conceptual applications of dreaming in micro-level settings. The small-group approach known as social dreaming involves small-group discussion and analysis of participants’ dreams. Clare and Zarbafi (2009) suggest this technique has a socially subversive potential since it offers a cognitive space “in which new ideas of the social emerge” (p.24). In a conceptual vein, Appreciative Inquiry (AI) frames an organization as “a mystery to be embraced” rather than “a problem to be solved” (Watkins and Mohr, 2001, p. 42). In AI’s Four-D Model (discover, dream, design, deliver), the “dream” phase involves “challenging the status quo by envisioning a preferred future,” while the dream and design phases together “involve the collective construction of positive images of the future” (pp. 44-45).

Cultural studies scholarship includes macro-level applications of the dream metaphor. Živković (2011) examines the social aspects of imagination through the framework of the dream. Focusing on the “strange ingredients of the national imaginary,” he suggests these elements “could be figured as the National Dream” of Serbia and argues that the researcher is “in the position of a dream interpreter” (p. 5). Gourgouris (1996) frames the national imaginary as dream rather than text, arguing that “those texts bearing the nation’s mark may ultimately be seen as descriptions of the nation’s dream thoughts, thus figural transcriptions... of the nation’s dream-work” (p. 30).

Apropos the current study, Metzinger (2009) shows how we might apply such insights to the evolving ecology of mass media (pp. 235-236). Contemplative practices, he says, provide insight into how advertising and mass media manipulate attention. The non-lucid dream state is an “example of consciousness without attentional control,” and insofar as commercial media undermines such control our normal waking state becomes “a mixture of dreaming, dementia, intoxication, and infantilization” (Metzinger, 2010, n.p.). He refers to this collective experience as “public dreaming.” As noted above, Buddhist philosophy outlines similar concerns, seeking through practice to move beyond the various forms of delusion at the root of suffering (Wallace, 2012, pp. 85-86). The following section identifies patterns within the dynamics of VR platform architectures and within the popular discussion of VR, which tend to exacerbate such concerns.

## 5. Techno-Utopianism and VR

Decades ago, Heim (1998) described three key characteristics of VR: immersion (experiencing a space other than one’s immediate environment); interactivity (causing immediate changes in one’s environment); and information intensity (experiencing the simulated environment in vivid detail) (p. 7; as cited in Purser, 2001, p. 215). Fictional novels of that time, including Neal Stephenson’s (1992) *Snow Crash*, imagined the full realization of all three dimensions and predicted the future development of omnipresent, fully immersive VR. Today, futurist Ray Kurzweil argues that such

environments are within reach. As if to demonstrate the imminent commercial viability of such platforms, Google recently hired Kurzweil, while Facebook hired Stephenson.

In response to the full-press effort of commercial organizations to pursue such programs, Madary and Metzinger (2016) outline a set of ethical principles for scientific VR research, and for its consumer-level use. Consumer-level concerns include the ability of VR platforms to “create robust social hallucinations” and develop advertising techniques that “can have a powerful unconscious influence on behavior” (p. 19). Indeed, as digital environments become more immersive, our narrative construction of self-identity increasingly mediated—from the creation of digital avatars on Facebook to the exploration of augmented realities in Pokémon Go. Engineers and executives play a powerful and ethically-fraught gatekeeping role. Research shows that Mark Zuckerberg, for example, imagines himself in the role of psychotherapist vis-à-vis Facebook’s users (Healey and Potter, 2017). The psychological stakes are higher as platforms become more immersive, and the dream-like quality of environments becomes more immersive, interactive, and data-intensive.

The ethics of VR should therefore involve a substantive understanding of the nature of the dreaming mind, and the ethics of large-scale social experiments in what Metzinger (2010) calls “public dreaming.” Only a small number of technology writers have acknowledged the link between immersive VR and dreaming (lucid or otherwise). Howard Rheingold, an early proponent of VR, co-authored LaBerge’s (1990) *Exploring the World of Lucid Dreaming*. Jaron Lanier, a pioneering engineer of VR, suggests that VR can potentially provide users with “a mass theater of spontaneous shared imagination and dreaming” (as cited in Purser, 2001, p. 223). While this article argues for drawing these parallels, it also insists on understanding key differences between dreaming and VR. These differences are a valuable key to identifying and addressing the ethical pitfalls of VR development.

Dream space and virtual environments differ significantly in psychological, technical, and socio-economic terms. In a lucid dream, the practitioner can distinguish limitations (imposed by memory or self-perception) as illusory. The presence of “shadow figures” from the unconscious allows a process of transcendence that integrates such figures with the rest of the ego, yielding greater psychological integrity (Wallace, 2012, p. 118). By contrast, users of digital platforms are limited by code—more specifically, by coders who increasingly serve as moral and social gatekeepers (Healey, 2015a, p. 949).

Moreover, commercial imperatives tend to construct static and enduring virtual identities. In what Balick (2014, p. 47) calls “virtual impingement,” the accumulation of static identities over time leads not toward greater integrity but a flattened conception of self-identity that serves the financial interests of advertisers, lenders, and credit agencies. Rather than challenging existing structures of self-identity, such environments reinforce them through enhanced personalization. Online self-identities are difficult to control due to the confusing nature of privacy policies, choice architecture that nudges users toward greater disclosure, and the dispersion of personal data that platforms can aggregate and sell to third parties. In other words, the current trend is toward outsourcing identity and imagination to online environments whose source coding is proprietary and who structure their operations with commercial interests in mind.

Questions of self-identity form the core of social media platforms such as Facebook. While the type of narrative thinking and identity construction afforded by social media is useful, it is easy to “get stuck in worrisome rumination about our past and future selves or become attached to some mental representation of ourselves” (Thompson, 2015, p. 355). Research indicates that contemplative practice makes it “easier to disengage from narrative forms of self-identification” (Thompson, 2015, p. 355). In this sense, the relevant insights from dream yoga are applicable even in today’s popular social media platforms.

Unfortunately, Silicon Valley tends to fetishize technology as a sacred source of human virtue (Healey, 2015a, p. 949). Contemporary digital culture exhibits a utopianism which may be understood as a form of technical idolatry (Healey, 2013a). In this context, fixation on VR's immersive potential is likely to overshadow our innate capacity for immersive experiences. As noted above, popular and promotional VR discourse assumes that immersive virtual environments are an unprecedented gift of technological innovation. In 1990, for example, the narrator of the documentary film *Cyberpunk* describes the implications of VR as follows:

Never before in the history of mankind has there been an alternative universe one could actually inhabit. Now that anyone can experience them, alternate universes are no longer the province of physicists, theologians, and supernaturalists. It is a matter of the creator and the creation. (Von Brandenburg, 1990)

This naiveté continues today. Mark Zuckerberg (2014) noted that the mission of Facebook's newly-acquired Oculus technology is "to enable you to experience the impossible." In one exemplary tweet, Unity Technologies CEO John Riccitiello likewise framed the technology as revolutionary:

VR is going to be driven by mobile. Dream 'em, build 'em, life will never be the same.<sup>1</sup>

Such rhetoric violates one of the basic principles of VR research outlined by Madary and Metzinger (2016, p. 19)—that researchers and news reporters must not over-state the potential benefits of these new technologies (see also Wong, 2016). As Purser (2001) notes, VR technologies are not "some magical 'techno-enlightenment' machine" (p. 229). In other words, virtuality is not lucidity (Healey, 2016).

The techno-romantic view of VR is problematic philosophically and in terms of its socio-economic impact. As Gunkel (2001, p. 153) suggests, the "transcendental pretensions of cyberculture" are rooted in the peculiar—and flawed—understanding of mind and body which characterizes Western scientific rationalism. Insofar as Silicon Valley ideology perpetuates this flawed view, its rhetorical and technical manifestations will "substantiate and reinforce the very systems of oppression and prejudice they promise to supersede" (Gunkel, 2001, p. 157). These problems are compounded to the extent that commercial VR technologies develop according to a hyper-capitalist world-as-spectacle aesthetic (Purser, 2001). Echoing Ellul's (1965) concerns about media as propaganda, Heim (1998) argues that this problematic aesthetic functions as a tunnel that "sucks us further into technology," or what Purser (2001) calls "a nihilistic void of pure simulacra" (pp. 219-220).

To raise these concerns is not to fall victim to a pessimistic determinism. The techno-romantic view of VR cedes ethical, creative, and philosophical authority to software engineers and technology enthusiasts who, however sincere in their beliefs and aims, do not conduct their endeavors in a vacuum. The dystopian scenarios depicted in science fiction films—or even, arguably, in Ellul's (1965) overstated claims—are not inevitable, but instead a measure of the relative failure of human judgment and democratic oversight of technical development.

One person's fantasy is another's nightmare. This is a point that Martin Luther King, Jr. (1967) made when, just four years after his most famous speech, he lamented seeing his dream "turn into a nightmare" as the violent fantasy of white supremacy, and the quiet reverie of a white majority's willful ignorance, continued unabated (p. 257). As theologian Walter Brueggemann (2010) argues, in

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<sup>1</sup> As cited by Google VR via Twitter. Retrieved from <https://twitter.com/googlevr/status/733335510526119936>

our journey toward the common good we must not allow those in positions of power, however well-meaning, to encode misguided fantasies into law. In other words, we must seek to avoid “policy rooted in nightmare” (p. 5).

Today, as Lessig (2006) reminds us, code is law. Avoiding code that is “rooted in nightmare” does not require abandoning commercial VR but recognizing the limits of commercial markets and the need to supplement them with non-commercial, public-good applications. With this aim in mind, the following section outlines an integral approach that harnesses VR not as a means of fantasy or escape, but as a catalyst to enhance our innate human capacities for aesthetic and even spiritually transcendent experience.

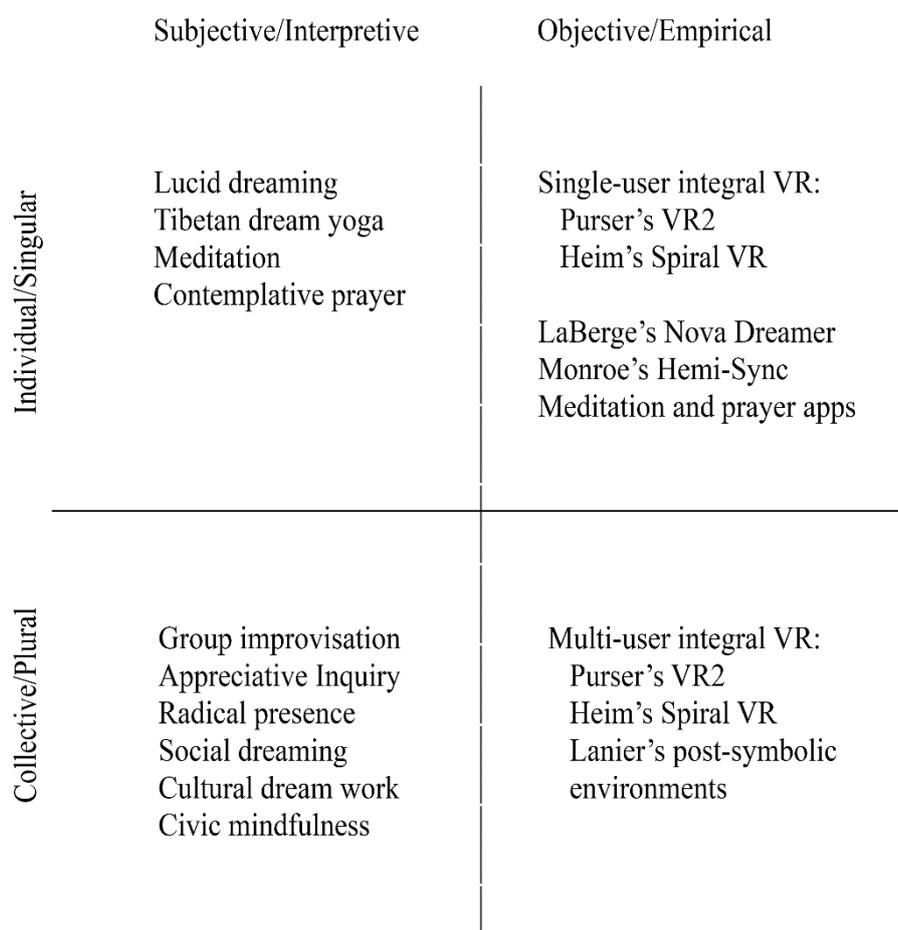


Figure 1: An integral model of VR technologies

## 6. An Integral Model for VR

Understood as a means, not an end, VR holds a deconstructive potential: to invert the dualisms (mind/body, self/other) that buttress instrumental rationality. Beyond the “rational-mental structure” of modern consciousness is “an integral mode of consciousness” wherein the dichotomy of reality

and dream, subject and object, may be radically displaced (Purser, 2001, p. 224). VR technologies could “open up human experience to a simulation of integral consciousness, providing a technologically mediated glimpse of a new vision, a new way of seeing the self in relation to the whole” (Purser, 2001, p. 227).

An alternative approach to VR development (referred to here as VR2), proceeds according to the imaginative aesthetic of “[the] world as shared lucid dream” (Purser, 2001, p. 227). As Purser (2001) explains, “We can liken VR2 to a new aesthetic that is akin to a state of lucid dreaming” wherein the user recognizes that “they are awake in a real-time dream” (p. 227). Heim (1998) describes this aesthetic as a spiral which “rotates us in virtual worlds that return us to ourselves, that deepen the wide-angle awareness we have of ourselves as primary bodies” (p. 98).

What is at stake here are the modes of consciousness that technical formations catalyze. Rather than the dystopian scenarios outlined above, it is possible to construct platforms such that “the subject of experience still exists but is no longer deluded about its nature” (Thompson, 2015, p. 324). Technologies that avoid fixation on self-image, instead creating opportunities to disengage from the process of identification with the content of one’s stream of thought, may allow users to move beyond “mind wandering” to mindfulness (Thompson, 2015, pp. 349-355). VR technologies that act as “an enabling technology for human betterment” (Purser, 2001, p. 214) may expand the creative, imaginative, and self-expressive dimensions of human experience. But they do so to the extent that we understand VR as an imperfect, material reflection of our innate imaginative capabilities—especially in dream lucidity. “Dreaming the virtual” thus involves integrating subjective, psychological development with objective development of the human senses and their various technological extensions.

As represented in Figure 1, an integral model of VR development includes the subjective/objective dimensions as well as the individual/collective dimensions of human experience. The right-hand (science, technical development) and left-hand quadrants (subjectivity, contemplative practice) co-exist in a dynamic, interactive process of mutual re-enforcement. Contemplative practices in the upper-left quadrant facilitate emotional, cognitive, and spiritual development. Collectively, contemplative principles manifest as the inter-subjective values of improvisation, shared imagination, and civic mindfulness. Individual technologies and the economic systems in which they emerge reflect, and reinforce, the insights of contemplative practice.

Researchers and commercial entrepreneurs have developed special devices designed to induce or facilitate dream lucidity and related cognitive states. Examples such as the Lucidity Institute’s Nova Dreamer, the Monroe Institute’s Hemi-Sync programs, and other “mindfulness” apps are included in Figure 1. Along these lines Martin Dresler, a brain researcher, argues that VR may be especially useful in cultivating lucid dreaming capabilities (Biegler, 2016).

While this aspect of integral VR development is important, the more challenging task is to apply the philosophical and ethical principles derived from dream yoga to the development of VR. The most important principle from this practice, which presented here as the Principle of Lucidity, includes two variations:

*Principle of Lucidity (analogue variant):* Always aim to cultivate the practitioner’s ability to distinguish a dream as such, whether during sleep or in the waking state, and to maximize the practitioner’s capacity for imaginative, conscious participation in the dream environment.

Translated into the context of VR development, the same principle reads as follows:

*Principle of Lucidity (digital variant):* Always aim to catalyze users’ ability to distinguish a constructed environment as such, and to maximize users’ agency in the ongoing co-construction of emerging environments.

In other words, avoid developing environments that ensconce users in dreams, fantasies, or imagined identities that may be mistaken for reality. As Christians (2006) argues, we succumb to propaganda by “equating the media’s universe with reality,” and we lose sight of its oppressive force as we “convince ourselves that we are really free” (p. 159).

On the level of design, applying the Principle of Lucidity involves creating technical affordances that enable users to call into question that which appears as, or is represented as, reality. On a broader level, it means transforming the political-economic system in which media technologies emerge. Lucidity, or civic mindfulness, is critical consciousness. It involves a demand for socio-economic justice. The next sections explore these two levels in more detail.

## 6.1. Interface Design

Certain design approaches are more effective in catalyzing these aims. There are clear benefits to Cave Automatic Virtual Environments (CAVE technology), which consist of multiple 3-D images projected onto walls. Based on the work of Myron Krueger, CAVE (and CAVE2) environments are found in their most developed form in the Electronic Visualization Lab at the University of Illinois at Chicago. Users have more freedom of movement, since they do not have to wear helmets (though some spaces combine wall projections with headgear). More importantly, such “spiral” designs are phenomenologically different since they allow for “apperception” in addition to simple perception. In other words, users’ awareness of their own body in physical space provides a fundamentally different sense of self-awareness and reflectiveness (Heim, 1998, p. 100). Char Davies’ OSMOSE installation, designed to explore “the interrelation between exterior Nature and interior Self,” is an early example of spiral environments (as cited in Heim, 1998, pp. 162-163). Users have reported memorable liminal experiences, comparable to meditative states, that challenge ordinary perceptual categories (Purser, 2001, p. 225).

More recently, medical researchers have developed VR spaces to address autism-related anxiety (Maskey, Lowry, Rodgers, McConachie, & Parr, 2014). The Blue Room helps patients confront daily anxieties such as shopping or crossing bridges. Conventional therapy involves the use of imagination—a facility with which most with autism have trouble. VR catalyzes the therapeutic process. Dream research is well equipped to enhance the development of such treatments, since it embraces the experience of nightmares as part of practice. As Wallace (2012) explains, dream practice involves “exploring the substrate [an aspect of consciousness known in Buddhist philosophy as *alaya*], which contains the good, the bad, and the ugly of our experience” (p. 104). VR therapy and lucid dream practice may therefore serve as symbiotic modes of treatment.

The interpersonal aspects of CAVE environments—emphasizing physical co-presence—hold potential benefits that solitary dream practice clearly cannot provide. VR environments may catalyze somatic learning, which facilitates the development of critical-reflective capabilities. Somatic models of learning (storytelling, reflective dialogue, dance, theater) enable “new ways of thinking and acting” (Rigg, 2016, p. 2). Engagement with the body and the affective-emotional dimensions of thought enables engagement with the shadow aspects of consciousness. CAVE environments that facilitate real-time communication between participants in a shared space can extend these somatic and affective benefits. Amar Bakshi’s portal project (<http://amarbakshi.com/portals/>), which uses virtual telepresence technology to encourage cross-cultural dialogue, is exemplary.

By contrast, the problem of “tunnel” immersion is more likely with head-mounted display (HMD) interfaces. Depending how much of the head it covers, the user’s sense of physical presence and self-reflection may be diminished. This design approach is more feasible for consumer-grade devices in commercial markets, though, and it is the basic design approach of all commercially developed VR on the market today, including Google Cardboard, HTC Vive, and Oculus Rift. Nevertheless, certain interface and application designs may make the principles outlined above more

achievable. There are already important design variations in commercial hardware. With its multiple sensors the Microsoft HaloLens, for example, enables mixed-reality environments that maintain users' awareness of immediate surroundings. The area of visual overlay is rather limited, however, and the hardware design is more expensive than full-surround headsets such as HTC Vive. On the other hand, while the latter does feature a "Chaperone" safety system that uses a single front-facing camera, its usefulness is limited. Such cost and design limitations will likely become obsolete in the coming years.

## 6.2. Platform Architectures

Beyond issues of interface design, developers must address issues of platform architecture (behind-the-scenes coding and network infrastructure) and content design (the perceptible environment with which users interact). Most platform architectures consist of proprietary coding that is opaque to users and other developers. For this reason, many researchers (especially those specializing in data visualization applications) have found it useful to pair commercially-available products with open source development platforms—for instance, HTC Vive and Unity.

Beyond the research lab, limitations posed by closed-code environments have prompted a backlash among hackers. For example, just as Facebook has begun to explore VR technologies with its acquisition of Oculus Rift, an open-source alternative to Facebook called Minds drew support from activists and citizen journalists for its use of encryption, its emphasis on privacy, and its use of what *Business Insider* calls a "de-mystified algorithm" (Weissman, 2015).

Interest in such alternatives is unsurprising, given the proliferation of "fake news" through social media during the 2016 U.S. Presidential election. That is precisely the type of problem for which the Principle of Lucidity, in its digital variant, is strikingly relevant and pressing. In other words, the term "alternate facts" refers to a process by which the ecology of digital media ensconces users within a delusional, and potentially nightmarish, ideological environment. Efforts to address the problem of "fake news" and "filter bubbles" are, in essence, efforts to apply the Principle of Lucidity.

Lanier further envisions VR platforms in which users can actively modify pre-programmed environments. Using advanced software and hardware, users could "create a shared world by programming it, by modeling it in real time" (as cited in Purser, 2001, p. 223). The result would be "a new form of communication where you directly create shared reality—real-time, waking-state, improvised dreaming" (as cited in Purser, 2001, p. 223). Users in such an environment could communicate with images, representations, and simulations in addition to verbal exchanges. This type of "post-symbolic order" could challenge the narrative structure of everyday verbal communication (as cited in Purser, 2001, p. 223). Environments of this kind follow an ethic of group improvisation, shared imagination, and participatory modes of knowing.

A contemplative approach to VR application design can enhance these potential benefits. For example, researchers might apply the techniques of social dreaming (described earlier) to the VR development by crowd-sourcing archetypal images and content. We may view such archetypes in a Jungian sense—as stable and autonomous, with a life of their own; or we may view archetypes in the sense that McLuhan articulated—as unstable entities that emerge as clichés evolve into new cultural archetypes (Braga, 2016). Open-source VR platforms could facilitate an interplay between both of these archetypal forms, in a manner that enables the integration of our personal and collective "monsters and demons" (Wallace, 2012, p. 118).

Open source platforms clearly afford certain benefits consistent with the Principle of Lucidity, and in many cases the transparency of code can enhance "mindful" technology development. Yet as Lanier (2010, pp. 124-126) rightfully notes, there are contexts in which proprietary code

development is valuable. Even in the context of contemplative practice, as Spiller and Wolfgramm (2016) suggest, some degree of “mindlessness” can be useful for both individuals and organizations. Routinization and automation (arguably the opposite of mindfulness) can be “a source of change and flexibility” (Spiller & Wolfgramm, 2016, p. 10). Our challenge is to exercise informed judgment with regard to what, if anything, should become closed and routinized, and what should remain transparent.

### 6.3. User Agency and Consent

The notion of informed consent is key to such judgment. Consider, as one example, how we might apply the Principle of Lucidity to the construction of memory in digital platforms. As critics note, Facebook’s memory architecture (e.g. the inclusion of “Your Memories on Facebook” in News Feed) is problematic insofar as it imposes constructed notions of relevance with little transparency. As Lanier (2013) notes, “companies like Facebook organize many people’s digital memories for the benefit of remote clients who want to manipulate what’s put in front of those people” (p. 313).

The digitization of memory is not a morally neutral process (Healey and Woods, 2017). This is not to say that we should reject tech-enabled narrative constructions of identity. They should be appropriately flexible, however, since individuals’ life stories are social processes that change over time. Digital platforms should reflect a contemplative understanding of memory rather than constructed notions that reflect the interests of commercial gatekeepers. Contemplative practice allows practitioners to “wake up” to the typically mindless process of narrative self-construction (Thompson, 2015, pp. 348-350). The question for developers is how to engineer processes of self-construction in VR platforms to provide this type of self-reflexive engagement.

Research along these lines is necessary, though of a different type than that conducted in recent years by Facebook and OKCupid. Both companies drew criticism for conducting real-time experiments without securing from users what would legitimately qualify as informed consent. As Facebook and other companies expand into VR research, especially in ways that draw from user profile data to construct personalized experiences, ethical principles for VR research will be necessary, including those articulated by Madary and Metzinger’s (2016). In addition to avoiding harm to subjects and refusing to over-hype benefits, companies should not over-state or misrepresent the amount of control users exercise over their data.

### 6.4. Policy Implications

In keeping with the Principle of Lucidity, researchers have developed methods for employing lucid dreaming in the treatment of nightmares in individual patients (Dresler et. al., 2017). In its digital variant this principle, as embodied in integral VR, may be effective in avoiding the collective nightmare envisioned by dystopian science-fiction writers, where media systems serve as propaganda weapons for elite gatekeepers. Technology entrepreneur Jamie Wong (2016) rightfully warns about the “amount of environmental control that will hypothetically be possible as virtual reality systems become more ubiquitous.”

Lucidity in a collective sense requires an alternate political-economic context in which to design and develop VR—a sustainable model for how technology developers and scholars can think about virtual space; how policy makers and industry professionals can responsibly guide the development of new technologies; and how users can choose, use, and respond to emergent technologies to enhance well-being. To develop VR ethically, to extract its full public good potential, requires a collective reckoning with the mythical narrative driving digital culture—an idiosyncratic mixture of Ayn Randian libertarianism, neoliberal free-market ideology, and Judeo-Christian apocalyptic eschatology (Healey, 2013a).

With three major players currently in the field (Oculus, HTC, and Sony) and an increasing number of companies manufacturing headsets and related hardware, monopoly control of the VR market is not an immediate threat. Nevertheless, digital technologies may amplify the tendency of commercial markets to veer toward monopoly, or at least oligopoly, control (McChesney, 2013). In fact, Facebook conceives of itself as an indispensable public utility “like electricity,” as one insider claimed—an aspiration that provides some justification for efforts to regulate such companies in a manner of past regulation of public utilities (Gillmor, 2012). Moreover, path dependency and technological lock-in has the potential to render aspects of identity self-construction opaque and unalterable, amplifying a collective form of mindlessness through automation. In this sense, the notion of civic mindfulness is antithetical to monopoly control by closed, proprietary systems, pointing instead to judicious use of open-source coding, cross-platform functionality, and collaborative development across geographic and cultural spaces.

To be clear, it is neither necessary nor desirable to abandon commercial markets. As powerful tools for technical development, commercial markets have drastically reduced the costs of VR hardware for use by researchers and non-commercial developers. Rather than abandoning or burdening markets with regulation, the goal is to bring greater integrity to the digital economy by ensuring that its commercial and non-commercial dimensions work symbiotically in service of the public good.

Adherence to the Principle of Lucidity may bring greater integrity to the digital economy by ensuring that the same companies who offer corporate mindfulness programs remain mindful of the impact of their business practices. As it stands, such organizations are guilty of “spiritual bypassing” (Häfliger, 2016). The continued presence of the hacker group Anonymous (whose role as a trickster figure in the collective psyche is symbolized by its members’ use of the Guy Fawkes mask) is symptomatic of a disjuncture between intention and impact in the digital economy. A political-economic system and its constituent organizations must be capable of facing and integrating their shadow elements. That is a risky process since it involves openness to unanticipated change (Häfliger, 2016). Appropriate regulatory frameworks, and policies designed to buttress non-commercial development and research are therefore part of a broader effort to ensure the recognition and integration of this collective shadow.

A number of emerging policy initiatives are in keeping with the Principle of Lucidity (see Healey, 2015a, pp. 963-964). The European Union’s General Data Protection Regulation (GDPR) addresses many of the concerns outlined above, including data protection by design, data portability, high standards for user consent, and the right of data erasure. Other initiatives such as Vendor Relationship Management (VRM), Customer Commons, and the Identity Commons project aim to move beyond proprietary approaches to user data exploitation toward models that prioritize user ownership and management of personal data. Alternative organizational structures such as the low-profit limited liability company (L3C) in the U.S., the community interest company (CIC) in Britain, and various worker-owned cooperative models in the U.S. and abroad are aimed at enhancing workplace democracy and the promotion of the public good.

Innovative organizational structures may also revitalize the institutions of professional investigative journalism, enhancing public awareness of technical development and its socio-economic impact. Journalism plays an important role in the ethical development of mass-media environments. In its more extreme forms, techno-utopian ideology is a delusion that must be recognized as such. From a Jungian perspective, rigorous investigative journalism engages and makes visible the collective shadow—the underbelly of the privileged self who has thus far steered the ship of the digital economy. Ironically, the use of VR by the *New York Times* may represent a powerful method of exposing the pitfalls of monopolistic commercial development of VR technologies if they remain in the hands of Google or Facebook.

## 7. Suggestions for Future Research

A primary test of any grounded theory is whether it is modifiable (Bryant, 2014, p. 121). The four-quadrant model outlined above is designed to be appended with new devices, platforms, and practices that do not yet exist or are still in development. Moreover, it is not merely a tool for categorizing new technologies, but a rubric for sustainable development. The question for scholars and developers is thus: What types of practices and technologies are best at integrating these dimensions, so they do not become fragmented and imbalanced? A secondary test is whether the grounded theory clarifies new types of data and hypotheses to be collected in future research (Bryant, 2014, p. 125). Future research may include the development of the following:

- Depth interviews and facilitated lab use of VR platforms with advanced dream practitioners, to produce practice-based guidelines for interface and software design.
- Arts-based research (ABR) studies to produce a) database repositories of dream journals, archetypal imagery, etc. for use in the digital humanities; and b) gaming environments with educational and/or non-clinical self-help applications.
- Experimental studies to determine whether and how integrated VR/dream-therapy methods might enhance clinical treatment of autism and anxiety.
- Experimental studies to determine whether and how mixed-reality platforms (e.g. Microsoft HaloLens) may be more effective for enhancing sought outcomes of contemplative practice (including but not limited to dream yoga).

The first of these lines of research is arguably the most important since the others will likely benefit from such foundational insights. Preliminary initiatives may involve roundtable discussions between technology developers and dream practitioners for the purpose of establishing points of resonance and formulating research questions. Specific research projects may include facilitated use of commercially-available VR platforms by dream practitioners to provide critical feedback on interface design, narrative structure, etc.; or early-stage projects to leverage dream practitioners' insights in the development of art installations, clinical treatments, and not-for-profit open-source educational platforms. Research along these lines may qualify for support from grant initiatives provided through the Mind & Life Institute, the Center for Contemplative Mind in Society, the Institute of Buddhist Studies, and the Henry E. Luce Foundation.

## 8. Conclusion

Regarding Facebook's acquisition of Oculus, Mark Zuckerberg (2014) pontificated that "One day, we believe this kind of immersive, augmented reality will become a part of daily life for billions of people." That may be true, but we cannot assume it will be uniformly beneficial. If we design VR environments responsibly, guiding development with reasonable ethical and legal frameworks to balance commercial interests with the public good, VR use may remind us of our own innate capacities for imagination—capacities which we tend to forget.

VR may amplify the problem of mass-mediated propaganda and demagoguery, leading to any number of nightmarish scenarios. It is tempting to indulge in the apparent pessimism of Ellul's (1965) sociological work, which argues that "liberal interventionism" in technical systems is inevitable (p. 190) but its results are typically "negative or nil" (p. 134; see also p. xi). Yet it is worth remembering that there is a dialecticism at work even in Ellul's dark vision—one which pushes the sociological toward the theological. The latter element overcomes Ellul's pessimism with what Christians (2006) calls a "dialectical 'yes'" (p. 119). The solution to the problem of technology is ontological: as Christians (1981) explains, "authentic solutions require remade persons, a new mode of being" (p. 153). In his theological turn, Ellul calls on us to bear witness to another world.

The argument presented here is similar to Ellul's. As the Aghan Sufi Hakim Sanai remarked, "humanity is asleep, concerned only with what is useless, living in a wrong world" (quoted in LaBerge, 1990, pp. 298-299). As long as Silicon Valley's techno-romantic ideology drives VR, we may remain trapped by the nightmare of greed and delusion. To awaken technologically requires that we awaken spiritually as well. In this sense, lucid dreamers are well-positioned to steer the ship of the digital economy (Healey, 2016). To the extent that VR environments abide by the principles derived from the practice of dream yoga and research on lucid dreaming, such technologies may yet serve as contexts in which "we dream ourselves into being" (Clare & Zarbafi, 2009, p. 4). These principles may yet enhance civic mindfulness, yielding a networked architecture that embodies the virtues of generosity, loving-kindness, and wisdom.

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