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Where Virtual Well-Being Becomes Reality

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Where Virtual Well-Being Becomes Reality

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Abstract

Strategies to mitigate the spread of COVID-19, specifically quarantine and social distancing protocols, have exposed a troubling paradox: mandated isolation meant to save lives has inadvertently contributed to a decline in America's well-being. Prolonged isolation due to more remote work and decentralized workplaces has been associated with widespread loneliness and diminished physical and mental health, with effects compounded by limited face-to-face access to social support systems. While remote communication technologies (e.g., video chat) can connect individuals with colleagues and social networks, remote technologies might have limited effectiveness in business and social contexts. This study uses Roger's Diffusion of Innovation Theory to explain and understand how, why, and at what rate new ideas and technology spread within an organization. The research question is, "What factors may increase the likelihood of adopting a virtual world technology for workplace well-being?" This study contributes to the business and academic sectors to further understand the potential of this innovative positive technology to increase social connection and create a sense of well-being and community for both remote and office-based employees.

Table of Contents

List of Tables

Chapter One: Introduction and Statement of the Problem

For decades corporate America has faced a nationwide problem: employees are not thriving, causing turnover, productivity loss, and unnecessarily high healthcare costs (Monie & Justin, 2021). In 2020, the World Health Organization (WHO) declared COVID-19 a global pandemic, and the health habits of Americans became staggeringly worse. Many adults reported undesirable changes in weight, increased drinking, and the inability to cope with prolonged stress (Bethune, 2021; Monie & Justin, 2021). While COVID-19 abruptly upended normal work routines, it also caused an acceleration of a trend already underway, involving the migration of work to an online or virtual environment (Kniffin et al., 2021). A Gartner survey of 229 human resource departments showed that approximately half of companies had more than 80% of their employees working from home during the COVID-19 pandemic and estimated substantial long-term increases for remote work after the pandemic (Baker, 2020). Even before the pandemic, "Virtual teams... are growing in number and importance" (Kniffin et al., 2021, p. 471; Kozlowski et al., 2016).

This intersection of remote work with the global crisis questions how anxiety and stress can be addressed in the virtual setting (Kniffin et al., 2021). The American Psychological Association's (APA) survey of United States (U.S.) adults, conducted in 2021 by The Harris Poll, shows that many (61%) experienced undesired weight changes, such as weight gain or loss. Since the pandemic started, 42% reported gaining more

weight than intended. They gained an average of 29 pounds (the median gain was 15 pounds), and 10% said they gained more than 50 pounds. Under stress, people often exhibit unhealthy eating, such as emotional overeating, overconsumption of high-fat, high-salt, high-sugar foods, and fewer fruits and vegetables (Xenaki et al., 2018). However, physical and mental well-being is not just declining; social well-being is also worsening. The problem of social isolation and loneliness continues to grow. Preliminary surveys show that within the first month of COVID-19, loneliness increased by 20–30%, and emotional distress tripled (Holt-Lui, 2020). Employees have commuted into offices or job sites and spent many days surrounded by colleagues; however, today, "most employees are working from home, and their daily routines have been significantly altered" (Wein, 2020). Many employees are isolated from their colleagues and struggle to maintain their physical, mental, and social well-being (Wein, 2020).

Organizations have had to navigate the unprecedented environment and find new solutions to challenges arising across many areas of their operations, including employee well-being (Carnevale & Hatak, 2020). Human Resource (HR) decision-makers are looking for new applications to recognize and assist with their working populations' mental, physical, and social well-being challenges (Kniffin et al., 2021). The Future Workplace 2021 HR Sentiment survey found that 68% of senior HR leaders rated employee well-being and mental health as a top priority (Future Workplace, 2021).

One of the key takeaways was that HR decision-makers need to use a multimodal approach toward well-being, inclusive of innovative technology to support employees working in the office or remotely (Am et al., 2020). HR decision-makers realized that

corporate well-being programs must change to meet the country's new remote and dedensified office-space arrangements (Kniffin et al., 2021).

The growing number of remote workers need well-being support with new and innovative applications and delivery modes (Kniffin et al., 2021). These new modalities must move beyond health portals where employees independently enter weight, activity, and food choices and must address and create social connection opportunities.

Klaus Schwab, the CEO and founder of the World Economic Forum, states in his book, "The Fourth Industrial Revolution," that we are in the midst of a transformation that fundamentally changes how we live, work, and relate to one another (Schwab, 2018). The Fourth Industrial Revolution is characterized by innovative technologies fusing the physical, biological, and digital worlds (Schwab, 2017). It fuses advances in many technologies, including but not limited to artificial intelligence, robotics, the Internet of Things (IoT), and immersive technologies, like virtual reality/virtual worlds. Virtual worlds are fully simulated 3D digital environments (Schwab, 2017). They are experienced simultaneously by users (Castronova, 2005) who interact and navigate through digital representations of themselves (avatars) to interact with others in the shared space.

Virtual worlds are persistent, multi-user online spaces (accessed by many participants simultaneously) that support social interactivity and connectedness (Johnston et al., 2012). Virtual world health preventive intervention design is informed by social cognitive theory and emerging research on avatar identification and the Proteus Effect (Johnston et al., 2012). The Proteus Effect describes a phenomenon in which an

individual's behavior within virtual worlds is changed by the characteristics of their

avatar. The users create a personal avatar to portray an actual or desired self-image.

Creating their avatar invokes the Proteus Effect, and the participant identifies with their

avatar and models its behavior (Yee & Bailenson, 2007). Social cognitive theory, used in

psychology, education, and communication, holds that portions of an individual's

knowledge acquisition can be directly related to observing others within the context of

social interactions, experiences, and outside media influences (Bandura, 2005).

Results offer solid preliminary evidence that not only can a 3D virtual world be as

effective as content as an in-person intervention, but it may serve as a more effective

platform to influence meaningful behavioral changes and increase self-efficacy (Johnston

et al., 2012). The virtual world experience is typically from a third-person view. This

virtual exposure to goal behaviors (exercise, nutrition, meditation) can lead to real change

with increased knowledge, self-confidence, and self-efficacy (Johnston et al., 2012).

Social interactions in virtual worlds can promote positive behaviors in real life

(Napolitano et al., 2013). Virtual world technology has the potential to unearth new

practices that meet the needs of human connection, affordability, consistency, efficacy,

and sustainability (Napolitano et al., 2013). A virtual world creates a new place for

people to connect and is often deemed as a *third place,* which refers to places where

people spend time between home (first place) and work (second place) (Oldenburg,

1999). Before the remote work phenomenon, a third place for employees to connect may

have been cafes, bars, clubs, or public libraries. However, with our new reality, the

virtual world application could become the third place for employees to exchange ideas, connect socially, build relationships, and collectively work on their well-being.

Virtual worlds and avatar technology have been around for over two decades, yet the adoption outside the gaming industry has been minimal. However, with more effective supporting technology (5G), there has been a resurgence of interest in virtual worlds (Mbunge et al., 2021).

This study aims to understand the lived experience of HR decision-makers pre during and post COVID-19. Specifically, reveling patterns and themes to understand what factors may influence HR decision-makers in their assessment of adoptability of a virtual well-being world for workplace well-being. This paper uses Rogers's diffusion of innovations theory and two major aspects of diffusion to provide a conceptual framework for understanding the diffusion process and potential adoption of the virtual well-being world. The two aspects of diffusion used in this study are: (1) perceived attributes of innovations and (2) adopter categories.

As the business world enters a phase of technology convergence, this study contributes to the corporate well-being industry and the literature by illuminating the transferability of virtual world technology moving from "gamer to patient" (Mathis, 2021, p. 13). This qualitative study used interviews with twenty HR decision-makers in the U.S. The HR decision-makers were recruited from a convenient sample from the Principal Investigator's (PI) existing professional network. Sessions were conducted on Zoom and included a survey, a video, PowerPoint presentation, a demo of the virtual well-being world and derdiscussion.

The literature described briefly in this chapter was deemed most relevant *a priori* to the research question. In Chapter 2, I provide a more thorough and systematic review of this literature. In Chapter 3, I describe the research methods used in this study. In Chapter 4, I show the results. In Chapter5 I, discuss the results, provide recommendations, and conclude.

Chapter Two: Review of Literature

This chapter reviews how COVID-19 has accelerated trends that were already underway, involving the migration to online and virtual working arrangements. In addition, there has been a renewed focus on a holistic approach to corporate well-being and the need for new technology applications that address physical, mental, and social well-being. This chapter also highlights the importance of positive technology, specifically the past research on virtual worlds and avatar technology for health and well-being improvement.

Acceleration of Trends Underway

Corporate well-being has been a top priority for over a century. The first corporate well-being program was in 1897 when Pullman Company established an athletic association in its employee-only housing. In 1948 WHO (2020) defined health as a "state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." The WHO (2020) defines wellness as "the optimal state of health of individuals and groups, and wellness is expressed as a positive approach to living." Employee well-being has an elastic concept meaning "any number of things to various people" (Danna & Griffin, 1997, p. 361; Wright & Huang, 2012). This study focuses on employee well-being and is defined as an employee that perceives themself as thriving physically, mentally, and socially at the workplace.

COVID-19 Work Impacts

The economic shutdowns and policy changes due to the pandemic have fundamentally transformed organizational practices (Kozlowski et al., 2016). Although work from home (WFH) practices were gaining popularity before the outbreak, COVID-19 forced many employees into mandatory WFH (Kniffin et al., 2021). The impact on employees included fundamental changes in work practices (e.g., working from home, virtual teamwork), as well as changes for workers (e.g., social distancing, stress, and unemployment) (Kniffin et al., 2021).

With the WFH trends, the rise of connectivity and communication technologies have become even more critical. Rather than assume uniformity in virtual team characteristics, it is valuable to recognize that "team virtuality" is a multifaceted concept and encompasses multiple dimensions, including the geographical distribution of team members and the relative amounts of (a)synchronous e-communication (Kozlowski et al., 2016). Often, this virtuality has been challenging for workers, such as Zoom fatigue, burnout, and lack of boundaries. There have also been potentially harmful emergent changes for workers, such as social distancing, which often leads to physical, mental, and loneliness challenges (Kniffin et al., 2021).

COVID-19 Impact on Well-Being

Today's workplace well-being programs reflect a holistic approach, caring for employees' physical, mental, and social well-being (Sparling, 2010). The benefits include a better work environment, better health, and reduced costs (Sparling, 2010). Current corporate well-being offerings include various options, such as health portals, well-being

challenges, webinars, telehealth sessions, and online and telephonic coaching (Wein, 2020).

However, due to the social distancing recently caused by COVID-19, addressing the loneliness of employees is becoming more critical (Kniffin et al., 2021). Workplace loneliness has negatively affected employees' affective commitment, affiliative behaviors, and performance, ultimately decreasing overall well-being (Ozcelik & Barsade, 2018). A close study of innovations that people started initiating within weeks of mandatory shutdowns (e.g. virtual lunch meetings) foreshadowed the opportunities that could be valuable for informing future practice and research intended to help prevent loneliness (Kniffin et al., 2021).

The loss of social connections for those laid off and those required to WFH is likely to impact workers negatively (Kniffin et al., 2021). Prior research has shown that high-quality social interactions—including informal chats among coworkers—are essential for mental and physical health (Mogilner et al., 2018). These types of interactions keep coworkers connected.

Against this backdrop the requirement for WFH and plans to dedensify workplaces in support of physical distancing are likely to have side effects that include at least some degree of harm to an individual's well-being (Kniffin et al., 2021). More insidious than the loss of social connections, loneliness is a psychologically painful emotion that results from people's subjective feelings that their personal and social needs are not adequately met (Cacioppo et al., 2006). However, loneliness was already considered "an epidemic" before this pandemic (Murthey, 2017).

Positive Technology

As face-to-face (FTF) support becomes scarce, personalized and adaptive virtual technologies may offer a new means necessary to assist workers (Kniffin et al., 2021). The last ten years have seen the development and maturation of several digital technologies that can have a critical role in enhancing employee happiness and psychological well-being. The last decade has seen the emergence of a new paradigm: Positive Technology (Gaggioli et al., 2019), the scientific and applied approach to using technology for improving the quality of the human experience. The foundations of positive technology are based on Positive Psychology, a science of positive subjective experience, positive traits, and positive institutions (Csikszentmihalyi & Seligman, 2000).

Csikszentmihalyi and Seligman (2000) defined positive psychology as the scientific study of positive human functioning and flourishing on multiple levels, including biological, personal, relational, institutional, cultural, and global dimensions of life. This growing discipline aims to understand human strengths and virtues and to elevate these strengths to allow individuals, groups, and societies to thrive.

Some applications of immersive technology can be considered positive technology, specifically when the participants experience an advanced form of reality simulation sharing similarities with the functioning of the brain. The immersive experience mimics the brain model as much as possible—and the individual will feel more present in virtual reality and the virtual world—making it the perfect tool for experiential learning (Riva et al., 2016).

Positive technology uses positive psychology strategies to identify three characteristics of a personal experience: affective/emotional quality, engagement/actualization, and connectedness quality (Villani et al., 2016). These three characteristics are key features that make it possible for the immersive technology to target different aspects of individual experience: emotional quality (hedonic level); engagement and actualization (eudemonic level); and connectedness (social and interpersonal experiences) (Villani et al., 2016).

The three critical factors of emotional quality are positive emotions, mindfulness, and resilience. Each of these factors is transferable to the virtual well-being world. The positive emotion strategies include writing therapy, exposure therapy, relaxation, positive ruminating, and reframing compassion meditation. Mindfulness strategies include mindfulness meditations, mind-body stress reduction, and mind-body cognitive therapy, which can help people consciously pay attention to thoughts and feelings (Villani et al., 2016). These strategies and modalities can all be created in the virtual world. Resilience is also a key factor and is frequently used interchangeably with "mental toughness." Mental toughness is a personality trait that determines how individuals deal with stress, pressure, pressure, and challenges irrespective of circumstances (Strycharczyk et al., 2019). Mental toughness could be practiced in the virtual well-being world through avatar role-play.

The second level of positive technology is related to the eudemonic concept of well-being. It consists of investigating how technology can be used to support individuals with engaging and self-actualizing experiences (Villani et al., 2016). The virtual world

has multiple social/interpersonal experiences, such as dancing, eating, and walking together. These activities support and improve social integration and connectedness between individuals, groups, and organizations in the virtual well-being world. The engagement and actualization quality (eudemonic level) are crucial factors to engagement, presence, self-efficacy, and motivation. The virtual well-being world embeds these strategies through challenges, skills, and intrinsic and extrinsic rewards to increase self-efficacy and self-motivation within this online cognitive-based therapy approach.

The third level of positive technology focuses on the social and interpersonal, which is concerned with using technologies to support and improve the connectedness between individuals, groups, and organizations. The four critical factors of connectedness are flow, gratitude, empathy, and altruism (Villani et al., 2016). Flow is when a person is in an activity, like the immersion that happens in the virtual world. Gratitude is also a critical part of social and interpersonal skills, all of which are practiced with others anywhere at any time. This could be play with others in the virtual world, gratitude visits to world, and gratitude journaling as part of the curriculum to create a social presence with others. Role-play in the virtual world can be successful due to the Proteus Effect. The participant is practicing the desired actions such as perspective-taking, and emotion recognition to help them with interpersonal skills and strategies. The last key factor of connectedness is altruism, which utilizes pro-social games and roleplaying strategies which can be embedded seamlessly in the virtual well-being world.

Using more technology during COVID to stay connected, i.e., Zoom and video calls, was critical but unfortunately generated many problems, such as tiredness, anxiety, or worry resulting from overuse of video conference platforms (Wiederhold, 2020). The technological exhaustion was caused by many of the shortcomings of video calls (delay, lack of eye contact, limited nonverbal cues) that take so much more out of a person than a face-to-face call (Villani et al., 2016) (See Table 9 Positive Technology).

One way to overcome technological exhaustion is by using different technologies. Facebook IQ commissioned a study by Neurons Inc to compare how sixty participants in the US responded cognitively and emotionally to using technology. All participants wore EEG headsets to analyze their brain signals and measure their level of comfort and engagement with conversing in VR versus having a conversation face to face (FTF) (Facebook, 2021). During the experience, individuals met in a conference room, appearing as full-body avatars. They could fist-bump or shake hands and interact with others in ways that made for an experience that was more like FTF meetings. The results suggested that participants—especially introverts—responded positively and were able to establish authentic relationships within the virtual environment (Facebook, 2021).

Virtual World Technology and Physical Well-Being

Due to the increased interest and demand, 3D virtual worlds are growing, and (Ghanbarzadeh et al., 2014) can be paired with or without goggles. Goggles can be seen as cumbersome (Ghanbarzadeh et al., 2014). Virtual worlds only require laptops or tablets, making them more accessible and affordable for participants and providers (Ghanbarzadeh et al., 2014).

Although FTF modalities have been the gold standard for workplace well-being and are potentially effective, they are often expensive, inconvenient, and require a significant time commitment. In addition, the COVID-19 pandemic increased the challenge of FTF well-being offerings. The current web-based interventions are easy to access anywhere but lack the vital aspect of human (social) interaction and often fall short of delivering genuinely engaging experiences. Both are critical elements of effective learning environments.

The virtual world can offer more direct support, engagement, and active learning than other technology solutions (Johnston et al., 2012). Based on education and behavioral theories and testing, this modality should lead to improved well-being outcomes. Early evidence that simulated health and well-being experiences via virtual worlds revealed efficacy (Johnston et al., 2012).

Participants act within the virtual world using an avatar—typically customizable so a user can portray an actual or desired self-image. When the participant creates their avatar, the Proteus Effect occurs, and the participant naturally shifts their behavior according to their digital representation (Yee & Bailenson, 2007). As one example, Stanford Virtual Interaction Laboratory Studies show that when people observe their avatar running, they will run longer in subsequent exercises (Yee & Bailenson, 2007).

A study conducted at Indiana University school of medicine, funded by Weight Watchers International, Inc, compared virtual world and FTF weight loss programs in a clinical setting. Both groups lost weight. The virtual world group lost two pounds more than the FTF group. More importantly, the virtual world group had increased physical

activity, healthier eating, and sleep, while physical activity declined in the FTF group (Johnston et al., 2012).

A University of Kansas Medical Center weight loss and weight management study of obese patients revealed that the FTF group lost more weight (a 10.8% loss of their body weight) than the virtual world group lost 7.6% of their body weight. However, weight loss maintenance for the virtual world group was more significant than for the FTF group (14% versus 9.5% of body weight, respectively). The virtual world participants are more likely to increase their level of physical activity after observing their avatar engage in those behaviors and being rewarded for them (Sullivan et al., 2013; Yee & Bailenson, 2007).

Virtual worlds can have many users in the same space, which supports social interactivity and connectedness among participants (Johnston et al., 2012). Due to social influence, social interactivity may promote positive behaviors emotionally (e.g., encouragement) or informationally (e.g., advice or knowledge) (Johnston et al., 2012). Virtual world users experience a sense of presence: the feeling of being in the virtual place rather than in the physical space where their body is located (Johnston et al., 2012). The notion of being there is enhanced by the possibility of doing there (i.e., participating in activities in the virtual world), a necessary condition for active learning (Johnston et al., 2012).

Virtual World Technology and Mental Well-Being

Stress management can enhance well-being by reducing stress and building resilience. The American Institute of Stress (2020) estimated that 75–90% of primary

care visits are related to stress. The gold standard for mental health has typically been FTF treatment. However, this modality of delivering stress management cannot reach all those who would seemingly benefit and is also hard to scale (Hoch et al., 2012).

Online mental health applications are scalable and have been growing to address common mental health issues (Alqahtani & Orji, 2020). Although many people with mental health issues use mobile app interventions, their adherence level remains low (Alqahtani & Orji, 2020). This low engagement of the users impacts the effectiveness of mobile interventions (Alqahtani & Orji, 2020). Participants that abandoned using the mental health apps said it was due to a lack of content variety, personalization, customer service, trust, and privacy concerns (Alqahtani & Orji, 2020). However, poor usability also emerged as a common reason users abandoned mental health apps (Alqahtani & Orji, 2020).

Hoch et al. (2012) explored the feasibility of translating a FTF stress reduction program into a virtual setting. The researchers paired virtual world technology and mind-body experts to translate an eight-week relaxation response-based resilience program into a virtual world application. This pilot study showed it is feasible to deliver a specific mind-body intervention through a virtual world environment. The researchers saw a general trend toward decreased perceived stress, depression, and anxiety symptoms in the virtual world participants (Alqahtani & Orji, 2020).

Rice et al. (2018) studied U.S. military active-duty service members and veterans as they practiced mindfulness meditation in three groups: in-person, virtual world, and in a control group (did nothing). Experimental groups showed more significant reductions in

stress over the 8-week program versus the control. Results from the study suggested that mindfulness training offered in-person and via the virtual world effectively reduced self-reported stress. The virtual world application was 11.5 hours shorter than in person, creating a time-saving experience as an additional benefit for participants. Virtual technologies have been touted as the next big thing for mental health (Martin, 2019).

A recent study revealed that becoming members of a social virtual world (SVW) increases the psychological resilience towards contracting COVID-19; this was explained by the disembodied experience encountered when users digitally represent themselves via an avatar in the SVW (Paul et al., 2022). The Proteus effect was extended to a more innate attribute of the avatar—its imperviousness to the human body's limitations. The finding that the participant would not be limited by their human body identified a novel coping strategy to strengthen individuals' psychological resilience against the COVID-19 pandemic (Paul et al., 2022).

Virtual World Technology and Social Well-Being

Due to the pandemic, the new normal of prolonged isolation has led to a troubling increase in loneliness among adults. The study of workplace isolation is unpinned with the notion of loneliness and how a feeling of being lonely can disrupt an employee's daily routine and impact performance (Peterson et al., 2016). Social support is critical to well-being, and feelings of loneliness can be mitigated by social support resulting in true connection (Schwarzer & Knoll, 2007).

Since the pandemic's start, virtual worlds have seen a resurgence in use globally (Dodd, 2020), leaving many to claim, "the confined are 'found' in virtual worlds" (Egan,

2020). The success of virtual reality predecessors, screen-based games, and virtual social worlds suggest that these platforms could alleviate social isolation and loneliness (Davis & Calitz, 2014). While a single technology may not remedy the psychological strain of the pandemic and social isolation, the virtual world's potential as a conduit to clinical and social support systems cannot be overstated (Pimentel et al., 2021).

The same affordances that make virtual world technology clinically effective also support long-held perceptions of the medium (and its predecessors) as revolutionizing human connection and socialization (Pimentel et al., 2021). Previous work shows that this technology can help individuals form meaningful social bonds with distant others (Tarr et al., 2018), cope with loneliness (Bahng et al., 2020), and improve mood (Bahng et al., 2020). Virtual applications designed for at-risk populations to engage in social activities (e.g., singing and dancing) can contribute to mental well-being via heightened connectedness and enjoyment (Pimentel et al., 2021; Tamplin et al., 2020).

Given the uncertainties of the post-pandemic, organizations need to actively support the well-being of employees (Kniffin et al., 2021). Employees need resources to adequately deal with pre and post-pandemic-specifics and uncertain job demands. To help address this, organizations must provide interventions to take care of employee well-being and help restore the balance between job demands and their resources (Kniffin et al., 2021).

Avatar Identification

Avatar identification, the extent to which an avatar resembles the user, is key to influencing users' behavior effectively. When the participant creates an avatar, the

Proteus Effect occurs, and the participant typically shifts their behavior according to their digital representation (Yee & Bailenson, 2007). In a study of virtual self-modeling, virtual self-models influenced health behavior change (Fox & Bailenson, 2009). Participants who witnessed the reward and punishment of their virtual self (avatar that looked like them) engaged in more voluntary exercise than those who saw an unchanging virtual self or no virtual self-representation (Fox & Bailenson, 2009).

A second study determined that either the reward of the virtual self-losing weight or the punishment of the virtual self-gaining weight was sufficient to encourage participants to exercise (Fox & Bailenson, 2009). However, observing either change in a virtual other (avatars that did not look like them) was insufficient to motivate participants to exercise. In the third study, participants who viewed their virtual-self avatar exercising engaged in more exercise in the 24 hours following the experiment than participants who viewed their virtual self-loitering (doing nothing) or viewed a virtual other. When users observed their virtual-self avatar rewarded for performing exercise behaviors (i.e., seeing their avatars losing weight as participants physically exercised) and being punished for not performing exercise behaviors (i.e., seeing their avatars gaining weight), they were more likely to repeat the physical exercises in the real world than users who observed virtual others exercising in the virtual world (Fox & Bailenson, 2009).

Horne et al. (2020) sought to determine if the inclusion of avatar technology leads to more significant weight loss achievement than routine interventions and whether it improves weight loss achievement by avatar personalization, reflecting themselves. Horne et al. (2020) reviewed six papers and revealed that avatar-based interventions for

weight loss management were found effective in the short-term (4–6 weeks), medium-term (3–6 months), and long-term (12 months).

The first study examined the effects of virtual embodiment and play in the virtual world to increase overweight adults' health self-efficacy (Behm-Morawitz, 2013; Behm-Morawitz et al., 2016). Virtual embodiment is the perception of sensory feedback related to an individual's virtual, non-physical body—also known as an avatar—and its effect on the individual's cognition (Behm-Morawitz, 2013). Health self-efficacy, or the belief in one's capabilities to perform health behaviors, is a significant factor in eliciting health behavior change, such as weight loss. The research was a randomized controlled trial (N = 90) examining the effectiveness of virtual embodiment and play in a social virtual world. Participants were randomly assigned to a 3D social virtual world (a virtual avatar interaction experimental condition), a 2D social networking site (no avatar virtual interaction control condition), or no intervention. The findings of this study provide initial evidence for the use of a virtual world to improve exercise efficacy and support weight loss. The difference in weight loss was slight; the virtual world participants lost 1.75 pounds compared to 0.91 pounds for the control conditions. The successful participants revealed two themes: virtual embodiment and health self-efficacy. The virtual embodiment theme was detected in participants' responses in relation to their feeling and perception of their avatar's effects on improving their motivation. Health self-efficacy responses focused on how a virtual world allowed them to try physical activities that they previously did not think they could do or had not done due to losing motivation and efficacy.

Cesa et al. (2013) evaluated traditional FTF cognitive-behavioral therapy (CBT) and virtual cognitive-behavioral therapy (eCBT). The eCBT was more effective than standard CBT in achieving physical well-being goals. Therapists used 14 virtual environments (Home, Supermarket, Pub, Restaurant, Swimming Pool, Beach, Gymnasium) during a 60-minute session with the patient. The environments presented critical and often triggering situations related to the maintaining/relapse mechanisms in the real world. By directly practicing the skills in the specific environments, such as a Pub or Restaurant, participants developed their own specific strategies for avoiding or coping with triggering situations (Cesa et al., 2013).

Johnston et al. (2012) explored virtual world intervention compared with a similar FTF program structure and content. Each week, certified fitness, nutrition, and support professionals led four 1-hour classes (Nutrition, Movement, Healthy Habits, and Support Group). The results compared outcomes, and the virtual world group lost more weight (Johnston et al., 2012).

Manzoni et al. (2011) evaluated the brief and long-term incremental efficacy of eCBT regarding obesity. Participants practiced eating, emotional and relational management, and general decision-making and problem-solving skills within the virtual world and successfully developed specific strategies to avoid or cope with triggering situations (Manzoni et al., 2011).

Napolitano et al. (2013) obtained feedback about an avatar program for modeling weight loss behaviors, overall technology development, and usability testing among potential participants. The survey found that 91% of participants enjoyed using the

technology, and the participants stated, "Seeing myself exercising or eating correctly could stimulate reinforcing positive choices" (Napolitano et al., 2013). These results indicate that the avatar and virtual world technology may be an effective modality for weight loss.

Ossolinski et al. (2017) evaluated the effect of a personalized future self (photograph) on weight change. The research team developed a prototype called Future Me, an app that portrays the effect of lifestyle on future personal appearance using input calories and exercises information to predict future body mass index. Some participants received a hard copy of their future self-image at recruitment (early image), and others received their future self-image after eight weeks (delayed image). Participants in the delayed image group lost more weight than the early image group. This reveals an opportunity for design for the virtual well-being world.

The systematic review of the six papers revealed that using an avatar appears to be a valuable adjunct to a weight loss management program among obese or overweight individuals (Horne et al., 2020). The personalization of an avatar appears to demonstrate additional benefits by engaging and retaining interest and motivation to comply with a weight-loss program (Horne et al., 2020). The results indicate that when a participant has an avatar in their likeness, it made a salient difference in the mental images of their bodies. This ability to customize one's avatar and use it to interact with others allows for a new way to assert one's embodied subjectivity (Ghanbarzadeh et al., 2014). This phenomenon has similarities to how behavior is learned from role models in the real

world, as posited by social cognitive theory, and may aid self-efficacy, leading to a sustained improvement in health behaviors (Napolitano et al., 2013).

Each study provided an essential piece of the puzzle for understanding the need and opportunity to use positive technology to aid in employee well-being. The pandemic created a rare but narrow window of opportunity to reflect, reimagine, and reset our world to start a healthier, more equitable, and more prosperous future (Schwab, K., & Malleret, T., 2020).

Theoretical Framework

Everett M. Rogers (1931–2004) is the most recognized name associated with the Diffusion of Innovation (DOI) theory. He literally wrote the book on the subject, publishing five editions of the seminal text "Diffusion of Innovations" (Miller, 2015). DOI seeks to explain how, why, and at what rate new ideas and technology spread. This study uses the DOI theory as a theoretical framework. The richness allows for various new ideas, practices, programs, and innovative technologies to become objects of diffusion research (Miller, 2015).

Diffusion is the process through which (1) an innovation (2) is communicated through certain channels (3) over time (4) among the members of a social system (Rogers, 1995). Diffusion is a special type of communication concerned with the spread of messages perceived as dealing with new ideas and representing a certain degree of uncertainty to an individual or organization. Innovation is the first aspect of diffusion; it is an idea, thing, procedure, or system perceived as new by whoever adopts it. Communication channels are how people develop and share information to achieve a

common understanding of the technology. Time is the third element and has three components: the innovation-decision process, adopter categories, and adoption rate. The fourth element of DOI is the social system. All diffusion occurs within a social system, whose members may be individuals or organizations but share a common goal or objective that links them together (Rogers, 1995).

There are five characteristics or attributes that affect innovation adoption: relative advantage, compatibility, complexity, observability, and trialability (Rogers, 1995). Relative advantage refers to the degree to which an innovation provides desirable consequences for the adopter compared to other available alternatives, providing the decision-makers with insight into its net benefits, favoring the innovation adoption decision. This means there is a perceived improvement over whatever exists that the innovation will replace and or enhance.

Compatibility measures how well the innovation aligns with the experiences, values, and needs of whoever is adopting the innovation. The more compatible an innovation is, the decision-maker becomes less uncertain. Greater levels of compatibility increase the expected net benefits of the innovation because it will require the decision-maker less effort to integrate the new technology with what is already deployed. Greater innovation compatibility levels are expected to positively influence adoption decisions in organizations (Rogers, 1995).

Complexity relates to the ease of understanding of innovations; more simple ideas are adopted faster than complex ones (Rogers, 1995). Concerning complexity, a new technology that is intricate and difficult to master requires decision-makers to invest more

resources to understand it and, subsequently, catch up with its adoption. This experience has a negative impact on the assessment of the net benefits of the innovation. More complex innovations are more uncertain to the decision-maker. Therefore, greater complexity levels are expected to negatively influence adoption decisions in organizations (Thong, 1999).

Observability is how visible innovation is to others. Observability may help decision-makers assess the positive features of innovation. When the innovation is readily observable by those considering adoption, it is adopted faster. Greater levels of observability may offer the decision-maker more significant opportunities to learn about the new technology, which increases its net benefits and, in turn, favors adoption decisions (Hashem & Tan, 2007).

Trialability is when an innovation adopter can test and assess the innovation before fully adopting and implementing it. Trialability offers the decision-maker the possibility to assess the net benefits of the innovation more effectively. As each of these characteristics increases, it is hypothesized that the adoption rate will increase (Lundblad, 2003).

Rogers defined an adopter category as a classification of individuals within a social system based on innovativeness. Rogers suggested five categories of adopters to standardize the use of adopter categories in diffusion research. DOI specifies that there will be a difference in perception between adopters and non-adopters. The adopters, in general, should have more positive perceptions of the new technology or innovation than

non-adopters. The adoption process includes awareness, interest, intention, and eventual adoption using the adopter groups (Rogers, 1995).

Adopters have five categories: innovators, early adopters, early majority, late majority, and laggards, based on their degree of innovativeness and the time required for acceptance (Rogers, 1995). The first adopter category is innovators. They take risks, have the highest social status, have financial liquidity, are social, and have the closest contact with scientific sources and interaction with other innovators. Early adopters have a higher social status, financial liquidity, advanced education, and are more socially forward. The early majority adopt an innovation after a varying degree of time, substantially longer than the innovators and early adopters. The late majority adopt an innovation after the average participant. Laggards are the last to adopt the innovation.

The five characteristics or attributes that affect innovation were analyzed to see patterns that increased the acceptability of the virtual well-being world. The adopter categories were analyzed for patterns and a measure of adoptability of the virtual well-being world.

Since the virtual well-being world is a solution to help prevent and reverse certain health conditions, it is important to note that prevention innovations are different. They often require an action to avoid an unwanted future condition. Hence, preventive innovations diffuse rather slowly, in part due to delayed rewards from adoption (Rogers, 1995). Nevertheless, several strategies accelerate the adoption rate (Rogers, 1995). One of the most effective strategies is when an innovation is adopted by a respected individual within a social network or organization, such as a CEO, Chief Human Resource Officer,

or another key decision-maker. Another strategy includes giving a particular innovation

to a group of individuals who will use the technology and provide positive reactions and

benefits for early adopters. There are also suggested features within organizations that

influence adoption, such as centralization of power, organizational complexities,

bureaucracy, interpersonal links within the social system, and the resources available

(Lundblad, 2003).

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Chapter Three: Method

As noted in Chapter 1, understanding what factors may increase the likelihood of acceptance and adoption of a virtual well-being world. Roger's DOI theory was introduced to explain and understand how, why, and at what rate new ideas and technology spread.

Chapter 2 reviewed several studies relevant to corporate well-being, the COVID-19 impacts on well-being, and the opportunity to use the positive technology available (virtual worlds and avatar technology) as a solution to address the decline in corporate well-being.

Chapter 3 discusses the research methodology, design, selection process of participants, and the materials and applications used to conduct the interviews. This qualitative study used a phenomenological approach and focused on the commonality of lived experiences of HR decision-makers pre, during, and post COVID-19.

As defined by Creswell (2009), "Phenomenology is a research strategy of inquiry in which the researcher identifies the essence of human experiences about a phenomenon as described by the participants." As described by Moustakas (1994), "Phenomenology seeks meaning from appearances and arrives at essence through intuition and reflection on conscious acts of experience, leading to ideas, consents, judgments, and understandings."

Although quantitative and scientific methods long dominated business research and decision making, qualitative methods are growing in significance and respectability. Qualitative studies may better deal with real-life issues and atypical answers (Walle, 2015). This method develops a comprehensive understanding of phenomena and converging data using multiple methods and data sources (Walle, 2015). Qualitative analysis allows various ways to conduct an inductive exploration of the data to identify recurring themes, patterns, or concepts and then describe and interpret those categories.

According to Groenewald (2004), "The operative word in phenomenological research is defined as a researcher that aims to describe as accurately as possible the phenomenon, refrain from any pre-given framework, but to remain true to the facts" (p. 5). This approach helps understand the meaning of people's lived experiences.

Data Collection

I used a semi-structured interview protocol in face-to-face discussions using an internet video conference service. I conducted interviews with twenty HR decision-makers. All interviews lasted one hour and were recorded through the Zoom video-conferencing program, producing video, audio, and text transcriptions.

During the first five minutes of the interview, the participant joined the Zoom meeting and received a consent form through the Zoom chat button. The participant read the consent form, and if they clicked the "I agree" button, they continued to participate in the study. Next, the participant completed a survey hosted on Survey Monkey. The survey collected two types of characteristics of the interviewee: individual characteristics (tenure, gender, age, exposure to virtual worlds and avatar technology) and organization

characteristics (size and industry) to illuminate what may have influenced adoption patterns.

Directly following, there was a ten-minute interview about the HR decision-makers perspective on the current state of well-being. The questions were general: How has corporate well-being changed over the years? Did COVID-19 make a difference? The participant was asked to define well-being. The PI inquired about the level of social interaction at work due to COVID-19, what was working, and if there were plans to enhance social connections. The last few questions were about understanding the participant's view of the digitization of well-being and familiarity with virtual worlds and avatar technology (see Appendices C, D, and E for a list of questions for each step of the interview).

Following the questions, the participant listened to a five-minute PowerPoint presentation on the virtual world research, watched a three-minute video providing a visual representation of the virtual world, and then watched a demo on creating an avatar and navigating the virtual well-being world (see Appendices A, B for video and PowerPoint).

The Principal Investigator (PI) showed the participant how to create an avatar to their liking, pick out their avatar's outfit, watch an educational video on the importance of exercise, and then run on the treadmill in the virtual world. The PI showed the participant how to teleport from the physical island to the mental health island. While visiting the mental health island, the participant watched their avatar do yoga, meditate, and practice Tai Chi. The PI and participant visited the nutrition area to learn the

importance of a healthy diet post-exercise by playing a game to learn what foods are most effective to eat pre-and post-workout. They attended a cooking class and had lunch in the restaurant. The final stops were the various areas to socialize and connect with others, including the fire pits, hot tub, and dance floor.

Study Population

I recruited HR decision-makers from a convenient sample within my network. They were personal contacts that I knew from the well-being industry. I had worked with half of the informants as a consultant, one as a co-worker and the rest were peers. The participants were qualified and chosen based on experience, role within their organization, and responsibility for overseeing the company's well-being program.

The HR decision-makers were a diverse sample from various industries, with different employee populations, in different roles, and variety in age, gender, and avatar technology experience. The diversity of the HR decision-makers and their organizations contributed to a range of different well-being priorities, strategies and technologies adopted, adapted, and evaluated due to the COVID-19 pandemic. Participation in the study was voluntary, with an option to end the study without risk or harm. All personal information was removed and de-identified to protect the anonymity of the participants and their organizations. No compensation was provided for participating in this study. Each interview was recorded through the Zoom video-conferencing program, producing video, audio, and text transcriptions.

Materials/Instruments

I used various materials in this study. The initial instrument was the University of Denver email with an embedded Calendly link to schedule interviews. The participants received a personalized email with details of the research study and the time requirement, and a question about whether they were interested in participating. If the HR decision-maker agreed to participate, they clicked on a Calendly link and scheduled a meeting time that was mutually beneficial for the investigator and participant. The interviews were conducted from December 2021 through January 2022. Zoom was used for audio, video, chat, recording, and transcribing the interviews. Zoom was a good tool for the collection of qualitative data because of its ease of use, cost-effectiveness, and the ability to record the interviews for data management and security (Archibald et al., 2019). Zoom features also provided opportunities for unique approaches to knowledge generation by allowing multimodal analysis of visual, spatial, and temporal elements, including body language (Archibald et al., 2019). Survey Monkey was used to collect consent forms and the frequency data on age, gender, tenure, experience with avatar technology and virtual worlds, size and industry of the company, and well-being priorities, see Appendix C.

Interview Protocol

The interview protocol was based on the literature reviewed and the theoretical framework in Chapter 2. The pre-questions were focused on how well-being has changed due to COVID-19. The remaining two questions addressed the digitization of well-being and familiarity with avatars and virtual world technology. Immediately following the pre-

questions, the participants watched a PowerPoint presentation and video and a live demo, see Appendix B, Appendix A.

Immediately following the demo, the PI asked a second set of questions. This semi-structured interview offered flexibility and opportunities for respondents to bring to light other factors not always answered in surveys (Williams, 2015). The PI asked questions to better understand the participant's thoughts about the opportunities, challenges, and barriers of implementing the virtual well-being world in the workplace. Additional questions were about the potential of investing financially to provide this technology and what was their perceived efficacy of the virtual well-being world.

The following section addressed if the HR decision-maker believed that the virtual world had the five characteristics needed for acceptability as defined by Rogers, compatibility, trialability, relative advantage, observability, and simplicity (Rogers, 1995). For the full list of questions, see Appendix D. The last set of questions addressed which adopter category the HR decision-maker aligned with and what adoption category they believe their organization aligned with.

The interview data was stored in Zoom. Data was coded to protect confidentiality. After acceptance of the completed dissertation, I stored the transcripts, audio files, video recordings, and consent forms in the cloud and will delete the files after three years.

Sample and Interview Data

I conducted twenty interviews with participants that built their careers in HR. The following section describes the frequencies of individual characteristics such as gender, age, tenure, experience navigating an avatar, and familiarity with a virtual world like

Second Life. The organizational characteristics were size and industry. I interviewed 13

females and six males; the majority were over 40 years old, had been with the company

for more than six years, and most informants worked for organizations that were medium

or jumbo size. Thirty percent of informants had navigated an avatar, and 40% had

familiarity with a virtual world (Second Life).

Table 3.1: Demographics (Using Valid Percent Due to One Missing Case)

Demographics	Number of Participants	Percentage
Gender	19	100%
Female	13	68.4%
Male	6	31.6%
Age	19	100%
20-29 years	1	5.3%
30-39 years	3	15.8%
40-49 years	4	21.10%
50-59 years	10	52.6%
60+ years	1	5.3%
Years at company	19	100%
0-1 years	5	26.3%
2-5 years	6	31.5%
6-10 years	4	21%
Over 10 years	4	21%
Size of organization	19	100%
Small 1-100	1	5.3%
Medium 101-999	8	42.1%
Large 1000 - 4999	3	15.8%
Jumbo 5000+	7	36.8%
Avatar Navigation	19	100%
Yes	6	31.6%
No	13	68.4%
Familiarity Virtual World	19	100%
Yes	8	42.1
No	11	57.9

Data Analysis

Data analysis is a way to discover "patterns, coherent themes, meaningful categories, and new ideas and uncovers a better understanding of a phenomenon or process" (Sutter, 2012, p.342). "The purpose of interviewing is to find out what is in and on someone else's mind. We interview people to find out from them those things that we cannot directly observe" (Patton, 1990, p. 278). Neuman (2014) described the process of data analysis as a means of looking for patterns to explain the goal of the studied phenomena.

This was a qualitative research design taking a phenomenological approach. The research methods included semi-structured interviews. I used Giorgi's method for analysis, which has the aim to uncover the meaning of a phenomenon as experienced by a human through themes and patterns. Using a thematic analysis, I followed Giorgi's six-step process; prepare and organize data, familiarization/explore data, assign codes to data, generate and review themes, create aggregate dimensions and perform the write. I used NVivo, which is a qualitative data analysis (QDA) computer software package produced by QSR International. NVivo can organize, analyze, and find insights from unstructured qualitative data. I chose NVivo due to its predominance in academic, health, government, and commercial research across various fields.

Credibility, Confirmability, Dependability, and Transferability of Results

I took steps to assure the credibility of the findings. I reviewed and validated the findings. To aid in confirmability, I recorded the interviews on the Zoom video conferencing program. The video recordings allowed for self-evaluation and realistic and

regular evaluation of the participants. I knew each participants due to previous

relationships working with them in the well-being industry. I took appropriate measures

to ensure each participant understood this research was not sponsored by any companies

but was part of the research for my dissertation.

For dependability, the participants completed a survey that validated the size of

their organization, years of service, industry identification, and responsibility for the

corporate well-being program. I did not entice the interviewees or incentivize them to

participate in the interviews. They participated independently.

Transferability of Findings

I structured this research so the findings could be generalized to innovative

technology applications outside of a virtual world, such as telemedicine or virtual reality.

Chapter Four: Results

In this chapter, I provided a detailed presentation of the study's results. I include a narrative description of the first-order concepts, second-order themes, and aggregate dimensions. I organized the results by aggregate dimension and within aggregate dimension by second-order theme and first order concepts. I identified three aggregate dimensions with the help of NVivo, including (a) changes in the well-being space, (b) acceptability of a virtual world technology application, and (c) adoptability of a virtual world technology application. The number of participants who described experiences related to each aggregate dimension and the number of references is listed below. In addition, within each theme I reviewed the first order concepts to see if there were any patterns revealing the priorities of the innovators and early adopters. See Table 2.

Table 4.1: Overall Findings

Aggregate Dimension	Number of Participants	Number of References
Aggregate Dimension 1: Changes in the Well-Being Space	20	152
Aggregate Dimension 2: Acceptability of a Virtual World Technology Application	20	157
Aggregate Dimension 3: Adoptability of a Virtual World Technology Application	20	164

Dimension 1: Changes in the Well-Being Space

Dimension 1 refers to the observed changes in how well-being was defined in participants' employing organizations over time. It was formed from two second-order themes, including (a) greater focus on mental health, and (b) greater focus on holistic well-being. I describe these themes in the following subsections. The codes used to form each of the two themes in this aggregate dimension, along with the number of references across the participants who described experiences related to each theme, as well the top priorities of Innovators (Innov) and Early Adopters (EA) are provided below.

Table 4.2: Aggregate Dimension 1

Aggregate Dimension 1: Changes in the Well-Being Space	Number of Participants	Number of References	Innov/EA Participants	Innov/EA Percent
Theme 1: Great Focus on Mental Health	19	48	14	
COVID-19 Increased Focus on Mental Health	15	19	14	100%
Less focus on ROI	7	7	5	36%
Mental Health Solutions	12	14	12	86%
More focus on mental health	7	8	2	14%
Theme 2: Great Focus on Holistic Well-Being	20	104		
Encouraging socialization	18	35	14	100%
Financial wellness	4	5	0	0%
More holistic thinking	12	15	10	71%
Physical care	6	12	1	7%
Social interactions in the workplace	8	10	6	43%
Well-being as self-actualization	3	3	3	21%
Well-being involves community	3	4	2	14%
Well-being is holistic	15	17	14	100%
Well-being is quality of life	2	3	1	7%

Greater Focus on Mental Health

All participants reported observing significant changes in how well-being was conceptualized over the course of their careers. There was a high level of convergence in the data regarding how well-being was previously conceptualized before those changes. First-order concepts indicated a shift away from a focus on employers' return on investment. Statements included, "I think wellness is changed much more for many companies. Return on investment is important, but I think more and more companies, especially with the spotlight on COVID, are focusing on mental health" (1); "Over the years, it's [well-being has] expanded beyond the physical. So, in fact, physical used to be the priority. It used to be about reducing the healthcare costs for the employer, and it's not there today" (8); "[Well-being] used to be things more like, 'How can this save the company on medical expenses?' Things like tobacco-cessation programs, and blood-pressure exams, and things of that matter, and now it's more inclusive of other health concerns that impact an employee, not necessarily the employer" (16). First-order concepts further indicated that as the focus of well-being shifted away from employers' return on investment (ROI), it increasingly encompassed mental health. Statements included, "Fifteen, 20 years ago . . . [well-being] was all from a dollar standpoint, and really what I see now is a lot more about what's our culture, what's it feel like to be here, how was your mental well-being and emotional health, and how can we support that as an organization" (2); "I felt like mental health and mental well-being and certainly addressing mental illness was something that was really starting to come into that wellness space" (15).

Convergence also occurred in first-order concepts indicating that the pandemic increased employers' shift toward a mental-health focus in defining well-being, as the following statements indicated: "Where wellness maybe five to 10 years ago was pretty strictly physical wellness, I feel like in the pandemic . . . one of the things we saw was like the mental-health kind of surge" (6); "[During the COVID-19 pandemic,] it became very evident that we need to at least address parts of people's well-being, especially their mental well-being" (7); "We've definitely had much more focus, as to what's happened the last few years [the COVID-19 pandemic], on the overall well-being of our associates, and especially on the mental, emotional side" (10).

The top priorities that emerged from the first theme, a greater focus on mental health, revealed some interesting patterns; one hundred percent of innovators and early adopters prioritized COVID-19 increasing the focus on mental health and 86% of these two groups were in the alignment on prioritizing more focus on mental health solutions.

Greater Focus on Holistic Well-Being

First-order concepts converged on the theme that the well-being space changed not only through the incorporation of mental health but through an expansion from a narrower focus on physical health to a more holistic perspective that included employees' physical, mental, social, and financial health. Statements included, "The broadening toward a more holistic view has become much more common, and that holistic view is more of an interconnected view of well-being, a whole-person approach" (5); "When I look at holistic well-being, the physical is just one component of that, but we have to focus on the other parts that fulfill our lives. That includes financial, includes social, it

includes professional, it includes community. It may include your faith" (8); "We, I think, transitioned to more of a well-being-type philosophy . . . so less about disease management, I think we really then moved into kind of more of a prevention model, now more holistic well-being" (13).

Statements indicated that because of the importance of socialization to mental health and well-being, employers encouraged socialization among employees, particularly to mitigate the negative effects of social isolation for employees who were sheltering in place during the pandemic: "We've tried to offer opportunities through health and well-being to facilitate social interaction with one another" (2); "To me, well-being, we had to think of innovative ideas where we could get our employees together" (3); "My director has been great about [encouraging employees to leave their cameras on to make video chats more interactive]. She said, 'Look, if you want to wear a hat, you're not feeling great today, I don't care, but it's important that we have that connection to each other'" (20). These statements were indicative of the reported employer focus on holistic well-being, which included a prioritization of mental health as well as consideration of employees' social health and how to enhance it during COVID-19 office shutdowns.

There were two top priorities of the innovators and early adopters from the second theme, a greater focus on holistic well-being. One hundred percent prioritized taking a more holistic approach to well-being, moving beyond just focusing on healthcare costs and ROI, and broadening the definition to of well-being to be more holistic be inclusive of mental, social, and even community well-being. They also prioritized socialization

among employees by encouraging them to engage in Zoom "Happy Hours" and dress up, as well as offering online classes and other connection points.

Dimension 2: Acceptability of a Virtual World Technology Application

This dimension refers to how acceptable the virtual world technology application (VW) was to the participants. It was formed from five second-order themes, which included (a) compatibility, (b) trialability, (c) relative advantage, (d) observability, and (e) complexity. The following subsections describe these themes.

The second-order themes in this dimension were aligned with the attributes of innovations described in the DOI theory, as proposed by (Rogers, 1995). Compatibility is an innovation's ability to be incorporated into existing structures and methods. Trialability is the extent to which an innovation can be tested or tried prior to full adoption. A relative advantage is a way in which an innovation improves upon existing methods. Observability is the extent to which an innovation's benefits and other effects are perceptible. Complexity is how easy or difficult it is to learn to use the innovation. Innovation diffusion is associated with high compatibility, trialability, relative advantage, observability, and low complexity. The codes used to shape the five themes within the second aggregate dimension are provided in Table 4. The number of participants who described experiences related to each theme as well as the number of references is also provided per theme.

Table 4.3: Aggregate Dimension 2

Aggregate Dimension 2: Acceptability of a Virtual World Technology Application	Number of Participants	Number of References	Innovators and Early Adopters	Innovators/EA Percent
Theme 1: Compatibility	20	24	14	
Compatibility is Mixed	8	9	3	21%
Compatibility is Present	10	11	10	71%
No Compatibility	2	4	0	0%
Theme 2: Trialability	19	39	14	
What features of this world do you think might work in your organization?				
No features would work	1	1	0	0%
Nutrition component might work for organization	3	3	2	14%
Physical fitness component might work for some employees	5	5	0	0%
Teaching people new ways to be healthy might work in organization	6	6	6	43%
Would you ever be interested in trying it out as a pilot or would you be more interested if it was offered through a health plan or well-being vendor?	18	24		
Interested in doing a trial or pilot	9	10	9	64%
Not interested in trying	5	6	0	0%
Would work with a wellness vendor	4	6	2	14%
Would work with health plan	2	2	2	14%
Theme 3: Relative Advantages	17	32		
Acceptability to younger generations	8	9	7	50%
Accessibility is a relative advantage	7	8	6	43%
Interaction	4	5	2	14%
Novelty is a relative advantage	5	5	1	7%
Versatility	1	1	1	7%
VW as an alternative to face-to-face is an opportunity	4	4	4	29%
Theme 4: Observability	20	45		
Low Observability	15	17	10	71%
No experience of VR or VW	17	22	11	79%
Observability is present	5	6	5	36%
Theme 5: Complexity	17	17		
Simplicity is present	13	13	13	93%
Some complexity	4	4	0	0%

Compatibility

Participants reported mixed perceptions of whether the VW was compatible with existing systems and structures in their organizations, although most participants expressed that the VW was at least partially compatible. Statements indicating full compatibility included: "Immediately when I saw the technology, I said, what a no-brainer, because we're using the same technology to host our virtual expos . . . Why not expand it into well-being? . . . I think that that technology is our future" (8); "I think [the VW has] got the right components. Do I think it's integrated? Yes. And do I think it could fit the [organizational] culture" (13); "I think [the VW] looked like it was very comprehensive. It'd be a nice fit" (19). Almost half of the first-order statements related to this theme indicated mixed or partial compatibility between the VW and existing systems in participants' organizations.

These statements included: "I can see a lot of folks getting on board, and I can see a lot of folks saying no" (6); "There's two groups. [One is] like people that are in front of their computer a lot of the day, and maybe they're taking a quick break and they would get into this world . . . but for healthcare workers that are treating patients on their feet, never looking at a computer, I don't really see as much of incorporating it into their workday" (9); "I'm not too sure about the social piece of it, but the other pieces, I see it fitting as a great tool for learning" (10). Only two participants provided statements indicating no compatibility with organizational systems and needs. An example of such a statement was, "[The VW is] not one that I would ever use . . . and it's not something I would want my employees to do. I just feel like there's a huge benefit to actual human

interaction without having it be on a virtual platform" (7). The first-order concepts associated with the compatibility theme were therefore indicative of mixed perceptions about the acceptability of the VW to participants' organizations. However, when looking at the innovators and early adopters 71% believed there was compatibility meeting the needs of some or all employees. When compatibility was present, participants consistently viewed the VW as more acceptable.

Trialability

About half of the first-order concepts indicated that participants assessed a high ability and willingness of their organizations to conduct a trial or pilot of the VW directly from the developer. Statements included: "I think I'd rather just do a direct [from the developer trial]. That's maybe just the capitalist in me saying not to deal with these middlemen" (4); "We would ask to see if we could have [the VW] on trial for 30 days standalone to see if we had people engage, and ask for their feedback after those 30 days, before we would consider adding it into the platform" (8); "I'd want to take this and do [a pilot] ourselves" (18).

Statements included: "If you put it into your Blue Cross Blue Shield plan, it's probably cheaper, but you can't customize a whole lot. The flipside is, if I do a direct on my own, I can customize a whole lot more, but now it's a standalone cost. [So,] I think it'd be potentially interesting from a wellness vendor" (1); "I almost think the well-being vendor might be the preference because, like when we do health screenings . . . we just want to make it clear that [Organization] doesn't know your personal [information]. So having that third party might be the best approach" (19). Two statements indicated a

preference for working with a health plan. One such statement was, "I think that payment and cost as it relates to the health plan is always an issue, so having them already intertwined and worked out is our preferred approach" (13).

Only four statements indicated no interest in piloting the VW. These statements included: "I don't think it's a technology we would use" (7); "I don't know that we would [conduct a pilot of the VW]. We looked at a virtual world for us for file storage . . . and it was quite interesting, but it was very expensive" (12); "That's one of the areas that we're not really given the freedom because of all the tax implications for what's considered a benefit, that we are not empowered at the business area level to really play in" (20).

Some statements indicated a greater receptivity to conducting pilots or trials when specific features of the VW appeared particularly well suited to meeting employees' needs. The following quote represents the view that the socialization aspect of the VW was well suited to meeting employee needs: "The ability to interact that way [through the VW] would appeal to a lot of our tech-savvy [employees]. We have a very tech-savvy organization, so I think that's a plus" (20). This statement was representative of the perception that the physical-fitness component of the VW would be particularly appropriate for meeting some employees' needs: "There are your individuals who don't want to work out in front of people. [The VW is a] great option if they're very self-conscious about who else is in the gym, or if I'm going to use this equipment right . . . and for those folks who, they can't do in-person, whether it's location, time commitment, [or] just odd schedules" (6). This quote represents a favorable reference to the physical-

fitness component of the VW that specifically referenced the nutritional aspect: "I think the physical, the nutritional, the yoga, are all very good" (10).

Perceptions of trialability were associated with favorable views of the VW as a whole or with the view that specific components of the VW were likely to meet some employees' well-being needs. 64% of innovators and early adopters were interested in doing a pilot. Four participants provided statements indicating that their organizations would prefer to work with a wellness vendor rather than directly with the developer. This is an important finding, since the healthcare or wellness vendor is preference, and the supplier of the virtual well-being world should not sell direct.

Relative Advantage

Almost all participants described the VW as having one or more relative advantages over their organizations' existing well-being programs. The most frequently cited relative advantage was the perceived appeal of the VW to younger employees, including members of Generations Y (Millennials) and Z. The following quotes were representative of this view: "There's definitely an appeal to the younger crowd" (4); "More Millennials will come in [to the VW]. They're used to this" (6); "I could see Gen Z's being way more interested in something like this, and a little bit more accustomed to new technology and new ways of interacting" (16). Other participants cited the greater accessibility of the VW versus traditional resources for well-being as a relative advantage over existing programs, as indicated in the following, representative statements: "You no longer have to get in your car and drive to a doctor. People, maybe, who have chronic illness . . . maybe if you can't go out for a run, or maybe if you're isolated in your

apartment . . . then maybe [the VW is] a way to help people in those situations" (7); "It's accessible at any time. I think that's what makes [the VW advantageous], you know, versus some [existing programs] that aren't accessible outside of business hours, I think that that's a plus" (10). Most participants thought that the relative advantage was engaging the younger generation with this solution.

Another view was that the VW's novelty was a relative advantage over more familiar, existing programs and practices, as represented in the following statements: "The advantage is, it's new and different" (1); "I think an advantage is it's cool and it's new" (2); "People love what's new, what's innovative, something brand new that people haven't tried yet, so obviously there's that appeal" (4). The VW was perceived as having a relative advantage as an alternative to face-to-face interactions, as the following statements indicated: "I could definitely see a benefit of that [VW], where [employees] could, especially if they're not in the office together, or whatever, go hang out here for a break" (12); "If it was something like a dispersed work group, [the VW] could be engaging. I can see that" (15). Most participants also indicated the novelty was also a significant relative advantage over existing programs and practices which increases the likelihood of the technology being more acceptable to them. 50% of the innovators and early adopters prioritized the relative advantage for targeting the younger generation, as the millennials and generation y.

Observability

Almost all participants stated that they had never observed the benefits or other effects of VWs because they had little to no prior awareness or experience of the

53

technology, indicating that the technology had low visibility. Low observability was associated with uncertainty about how beneficial the VW would be, hence with lower adoptability, as I will discuss in relation to Dimension 3 later in this chapter. When participants were asked if they had heard or seen information about VWs prior to the demonstration during their interviews, representative responses included, "I'm aware of the fact that they exist. I haven't deeply studied them or engaged in them" (3); "No, not really" (5); "Not really. I mean, I've known it's been out there" (10). Asked what they knew about VWs or VR, participants provided responses consistent with the representative ones just quoted, including, "Nothing" (6); "I've never used it, so it's hard for me to say what a virtual world would look like" (7); "Zero" (13). Thus, participants regarded the observability of VW technology as low because they had little or no experience or knowledge of it prior to the demonstration during their interview. The low observability is not surprising, especially based on the age of the HR decision-makers, and that virtual worlds have been mostly in the gaming industry, which tends to be younger generations.

Complexity

Most participants described the complexity of the VW as low, a perception associated with higher receptivity to trying or adopting the technology. Asked to discuss the simplicity or complexity of the VW, participants gave responses such as the following representative ones: "I thought it was pretty easy to use. I mean, it's pretty self-explanatory" (11); "It seems simple to navigate" (14); "I would say it's simple. I'd say it seemed very easy to use" (16). Four participants described the VW as having some

complexity, as in the following representative responses: "It seemed like there were some technology issues to be worked out . . . it does feel like it's kind of in the beginning stages . . . And so, I think it could be smoother as you went along" (7); "I worried that because you're familiar with it and you were challenged with it, I would be worried if others would have that same challenge" (8).

The priorities of the innovators and early adopters revealed a pattern that seventy-one percent believed compatibility was present, and 64% were interested in doing a pilot, 50% prioritized acceptability to the younger generation was a relative advantage. Although observability was low (71%) and 79% of innovators and early adopters did not have experience with a virtual world, 93% prioritized that it was easy to use.

Dimension 3: Adoptability of a Virtual World Technology Application

This dimension refers to participants' willingness to adopt the VW. It was formed from five second-order themes, including (a) adoption propensity, (b) processes for technology adoption, (c) likelihood of organizational investment, (d) perceived efficacy of the technology, and (e) barriers to adoption. The codes used to shape the five themes within the third aggregate dimension are provided in Table 5 below. The number of participants who described experiences related to each of the five second-order themes, along with the number of references are also provided. The following subsections are descriptions of these themes.

Table 4.4: Aggregate Dimension 3

Aggregate Dimension 3: Adoptability of a Virtual World Technology Application	Number of Participants	Number of References	Innovator I/EA	Innovator I/EA percent
Theme 1: Innovation Propensity	20	41	14	
Organization	20	20		
Innovators	1	1	1	5%
Early adopters	6	6	6	30%
Early majority	10	10		
Late majority	3	3		
Laggards	0	0		
Self	20	21		
Innovators	5	10	5	25%
Early adopters	9	6	9	45%
Early majority	4	6		
Late majority	2	2		
Laggards	0	0		
Theme 2: Processes for Technology Adoption	14	16		
No policy for making decisions	3	3	2	14%
Policy is to recommend adoption to leadership	11	13	6	43%
Theme 3: Likelihood of Organizational Investment	19	30		
Organization may invest	8	8	8	57%
Organization unlikely to invest	5	5	0	0%
Positive view of digitization	11	13	11	79%
Whether organizations will invest depends on price	4	4	4	28%
Theme 4: Perceived Efficacy	16	22		
No Perceived efficacy	2	3	0	0%
Perceived efficacy of VM is unknown	8	9	3	21%
Potential efficacy in VW	7	10	7	50%
Theme 5: Barriers	20	55		
Negative view of exclusive reliance on digitization	11	12	5	36%
Privacy concerns	4	5	2	14%
Resistance	10	13	5	35%
Social isolation	5	5	1	7%
Time constraints	7	7	2	14%
Transferability	11	13	11	79%

Adoption Propensity

This theme aligned with the five adopter categories associated with Innovation Diffusion Theory, as proposed by Rogers (1962, 2010). In descending order from highest to lowest adoption propensity, the five adopter categories are innovator, early adopter, early majority, late majority, and laggards. Innovators are characterized by high-risk tolerance, social influence, and access to resources. Members of the early adopter category are described as having high social influence and access to resources but a lower level of risk tolerance than innovators. Early majority adopters are defined as having contact with early adopters and no more than average levels of resource access and social influence. The late majority category refers to individuals who adopt an innovation after most people have already done so. This category is characterized by below-average risk tolerance, social influence, and access to resources. Members of the laggard category tend to be risk- and novelty-averse and have small social networks and little access to resources (see Adopter Categories, Table 8).

Responses about the adopter category in which participants would place themselves were mixed. A large majority of participants placed themselves in the innovator and early adopter category, with representative statements including, "I wouldn't say that I am at the top, but I definitely number two" (8); "I tend to fit into the early adopter because I'm always looking for new ways to do things" (11); "I am probably in between the first two . . . I definitely am always open to new technologies, and what's what out there, and using technology to the to its fullest. I'd be the one in

there trying to figure out how to use it, make sure it's working, so I can help our employees use it" (12).

A large minority of participants placed themselves in the early majority category, with a representative statement being, "In general I'm an early majority. I'm not an early adopter for sure. I want to test it out, so for me personally, early majority for this particular technology" (7). Two participants viewed themselves as being in the late majority category, with one explaining in a representative statement, "I'm fairly low. I mean, I'm aware of it, but I'm never educated" (3). One participant placed himself in the innovator category, explaining, "I will be the first one in, like I love seeing things when they're just getting started because the possibilities are endless, right? So, I think the chance to shape, that is where I am now" (5). These results indicate a large number of innovators and early adopters, much higher than the DOI theory hypothesizes.

Participants' statements of which adopter category they considered their organization to be in indicated lower levels of adoption propensity than participants attributed to themselves, with half of the participants describing their organizations as early majority rather than early adopters. This was not surprising since most companies have technology decision making processes, and often want to see if the product works and is effective before they invest. Representative responses from this category included, "They're certainly not innovators. There's some early adoption, but more in that middle [category]" (5); "I put us in the middle. So, like early majority" (8); "The company as a whole, I think we probably somewhere in the middle. We'd have some that are go-getters, and yet some that wouldn't necessarily embrace [the VW]" (12). Other views

included those of the five participants who described their organizations as being in the early adopter category, with a representative response being, "We're not the first, but a five-point scale of one is the most progressive and five is the least progressive, we're probably a two. I mean, we're very progressive" (2). Three participants described their organizations as being in the late majority category, as in the following representative statement: "If you'd asked me two years ago, I would've said the very last one. I think we've moved the needle a little to the second to last" (19). Two participants described their organizations as innovators, with one such response being, "I think we've got enough vocal leaders who embrace change, and they're excited to share. We're a culture of innovation" (17). Overall, participants perceived themselves as having a somewhat higher innovation propensity than their organizations, with the most frequently cited category for participants themselves being early adopters, and the most frequently selected category for organizations being an early majority.

Processes for Technology Adoption

Participants' responses had a high level of convergence in describing their organizations' processes for adopting a technology, with most participants stating that the most they could do in their position was to make a recommendation, which would trigger a review of the technology by organizational leaders, a committee convened for the purpose, and a budgeting authority. These processes affected the adoptability of the VW technology by making adoption more difficult. Representative statements included: "We have a committee of leaders that evaluate that . . . we need to get their support on it and approval, and it needs to go up through our CEO. There is a pretty rigid process to go

59

through" (8); "In the process of making technology decisions . . . it would definitely be a cross-functional team" (12); "In this case, our benefits or wellness group would propose that it get approved by our department leadership . . . then there is a more formal, annual review process for all new technologies . . . the more integrated the solution, the more likely it is to go through that process" (13). Only three participants reported that they had final authority to implement a new technology solution in their organizations. A sample statement describing this situation was, "There are no rules, no budget. A blank canvas— What do we need to do?" (2). For most participants, processes for getting a new technology solution approved were highly formalized and involved multiple, high-level organizational stakeholders, making the innovation adoption process more difficult. This finding is in alignment with why individuals identified as innovators and early adopters, but significantly less on behalf of the organization.

Likelihood of Organizational Investment

When participants were asked how likely organizations, in general, would be to invest in the VW, the responses were mixed. Perceptions ranged from high to no likelihood, with some participants falling in between, stating that the likelihood depended on the price of adoption. Representative responses from participants who perceived a high likelihood that organizations would invest in VW technology included: "Oh, absolutely. We'd do it today" (8); "I could have seen this being really exciting for like a new wellness program" (16); "Yes. If you're really talking as a business about employee experience and engagement, and your employees being the priority in everything, why wouldn't you invest?" (18).

Representative responses expressing the view that organizations' willingness to invest in VW technology depended on the price of adoption included: "I think it depends on the price . . . the organization [where] I'm working now, yeah, it's a possibility. For the organization that I was at previously? No way" (1); "If there's an ROI, or it makes it through their cost-benefit analysis, I do see that organizations could adopt this and want to use it" (10); "It would have to be a low price" (15). The following representative quotes expressed the view that organizations were unlikely to invest in the VW technology: "It almost seems like it's tough for an employer, unless they're super-progressive, to really get on board and say, 'Yes, that's it, let's do it.' I think you could get some, but I think that most would not be there yet, and I don't know if they'd ever get there" (2); "For current, today, I don't believe so. I think it would need to be vetted more with more studies" (9); "I think wellness is super important. Do I think that [my company] would invest in this technology? I do" (17). Thus, participants who described a low likelihood of organizational investment referenced uncertainty about efficacy and insufficient innovation propensity as decisive factors.

57% of the innovators and early adopters prioritized a positive perspective of investing in this technology, which is alignment with where the healthcare industry is already headed. However, there is often a wait and see the effectiveness of the technology mindset before buying. This is even more relevant due to the challenge of quantifying the savings based on preventing a condition that may or may not manifest versus treating a condition.

Perceived Efficacy of the Technology

Reluctance to adopt was associated with uncertainty about the efficacy of the technology, which was associated with the low observability of the benefits in the media to which participants had been exposed prior to this study. About half of the participants expressed uncertainty about the technology's efficacy, as in the following representative responses to the question of how effective they perceived the VW: "I'm neutral on it. I just I don't know enough about it" (1); "I don't know that yet. I think that we're still measuring that" (8); "I don't know the answer to that question. I'm not fully convinced" (15). Thus, uncertainty about the efficacy of the technology was associated with the low observability of its benefits, which participants referenced in stating that they did not know enough about the technology's efficacy to assess it. This finding was corroborated by the statements of the two participants who perceived the technology as having little to no efficacy, as in the following statement, in which the participant stated that she could not see the benefits: "Red flags rise for me in that I didn't see it [the benefit of the technology]. I mean, I'm opting to create my avatar and to participate, right, and it's no different than when you're playing videogames online or on your computer, or whatever. So, I don't see anything" (11). The late majority typically take a wait and see approach for innovative technology and may not adopt the innovation until it is mainstream.

A large minority of participants expressed the view that the VW was potentially effective. The following responses to the question of whether the VW could be effective were representative: "I think it could, yes, I think there's a future there, but I don't have all the answers, for sure" (4); "I think, if done correctly, it's a really powerful opportunity

62

to teach skills that are transferable to the real world" (5); "Yeah. It's changed a lot, because at first, when bots and avatars came out, it just looked like a cartoon and childish, and things have changed so much" (19). Notable in the three responses was the uncertainty about efficacy expressed in the first two and the lack of any reference to effectiveness in the third. In summary, this is to be expected as it is hard to prove efficacy when demoing an alpha product, unless you are an innovator or early adopter and can see the potential in the future.

Barriers to Adoption

This theme was focused on the barriers and disadvantages that participants described as impeding the adoption of the VW technology. Views of the nature of the barriers were mixed, but all participants perceived at least one significant challenge. The most frequently cited perception of a disadvantage in the technology that might lessen its adoptability was a majority of participants' skepticism that skills and lessons users learned in the VW would transfer from that setting and modify behavior in the real world. Representative quotes to this effect included: "How do you stand out, and get people excited about this, and take the time to do this, and translate sitting on their chair doing that to actually taking more time in real life to carry it forward?" (2); "I also need help translating how I don't sit in my chair and watch it, but actually translate to action and behavior change. That's the piece that I probably need a little more grounding in" (11); "Whether somebody would actually really sit and do their yoga with their avatar, I don't know" (19). Like other impediments to adoption, uncertainty about how well VW use would translate into real-world behavioral changes was associated with the low

observability of the benefits of the technology in the media to which participants had been exposed prior to this study, as indicated by overt expressions of uncertainty in the preceding quotes ("I don't know") or by phrasing the response as a question, as P2 did.

Every innovation has barriers to entry. The challenge with the virtual world technology is the need for more observability so people can truly understand the Proteus Effect and how it truly can increase the likelihood of adopting the technology to support them in becoming the best version of themselves, by watching themself make health choices while in avatar form.

A different barrier that half of the participants viewed as potentially impeding adoption of the VW technology was the perceived likelihood that some employees would resist using it. Representative statements expressing this view included: "I think Gen X and Boomers would have a hard time with this" (4); "It's creepy to me. I'm sorry. It creeps me out" (7); "This will be a technology that people might be resistant to" (9). There is always resistance to change, but with time this can be overcome, especially since the metaverse has the potential to change the way we live, work and play, just like the internet did over twenty years ago.

Some participants expressed concern that time constraints would impede employee use of the VW, making adoption less desirable to an organization that would want high rates of participation to justify an investment. Representative quotes to this effect were as follows: "I can see people saying I'm so busy, I don't have time to do that" (10); "Our people put in eight to 10 hours a day, depending on what projects and things they're working on. I think the challenge could be possibly just building in time" (12);

"We have this very, very strong mentality, down to the decimal point, of how we charge our time as salaried professional employees. Is this okay to do on the clock?" (20).

Time constraint are a challenge for any well-being modality. It takes time to go to the gym, it takes time to drive to a WW program, it takes time to go to the grocery store for healthy food. This technology allows for the participant to engage in the virtual world and the real world at the same time or like a traditional face to face program where you get content and then practice on your own. However, the big difference between face to face and the virtual world, is the virtual world takes less time (no driving) and is available anywhere and anytime, enhancing convenience.

In another view, some participants expressed concern that using the VW would exacerbate social isolation rather than alleviate it. Representative responses included: "You're going to be so into your virtual world, you're never going to have a need to go around, interact with real human beings . . . The question would be, is this actually helping, or is this contributing to social isolation?" (2); "I think that when you take away the actual [in-person] human interaction, even if there's a human on the other side [of the VW], I think that it leads to people—it makes them feel much more isolated" (7); "I think that it can be too much of a distraction and take away from actual connections" (17). The concern about exacerbation of social isolation was essentially a concern about the VW's efficacy, given that participants were told that one of the technology's intended benefits was the facilitation of social interaction. A few patterns emerged from the innovators and early adopters, 43% all followed a process for and had to recommend the adoption to top management. Seventy-nine percent had a positive view digitization. The biggest barriers

seemed to be transferability; specifically, "how do you get the participant to transfer what they do in virtual world to the real world."

Table 4.5: Adopter Category

Findings by Adopter Category					
Demographics					
Gender X Adopter Group	Female		Male	Number of Participants	
Innovator	60% (3)		40% (2)	5	
Early Adopter	75% (6)		25% (2)	8	
Early Majority	50% (2)		50% (2)	4	
Late Majority	100% (2)		0% (0)	2	
Laggard	0% (0)		0% (0)	0	
Total	13		6	19	

Age X Adopter Group	20-29 yrs.	30-39 yrs.	40-49 yrs.	50-59 yrs.	60+ yrs.	Number of Participants
Innovator	20% (1)	0% (0)	20% (1)	40% (2)	20% (1)	5
Early Adopter	0% (0)	0% (0)	12.5% (1)	87.5% (7)	0% (0)	8
Early Majority	0% (0)	75% (3)	0% (0)	25% (1)	0% (0)	4
Late Majority	0% (0)	0% (0)	100% (2)	0% (0)	0% (0)	2
Laggard	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Total						19

Tenure X Adopter Group	0-1 yrs.	2-5 yrs.	6-10 yrs.	Over 10 yrs.	Number of Participants
Innovator	20% (1)	16.7% (1)	25% (1)	50% (2)	5
Early Adopter	60% (3)	50% (3)	25% (1)	25% (1)	8
Early Majority	20% (1)	16.7% (1)	25% (1)	25% (1)	4
Late Majority	0% (0)	16.7% (1)	25% (1)	0% (0)	2
Laggard	0% (0)	0% (0)	0% (0)	0% (0)	0
Total					19

VW Navigation X Adopter Group	Yes	No	Number of Participants
Innovator	60% (3)	40% (2)	5
Early Adopter	37.5% (3)	62.5% (5)	8
Early Majority	0% (0)	100% (4)	4
Late Majority	0% (0)	100% (2)	2
Laggard	0% (0)	0% (0)	0
Total			19

Familiar with SL X Adopter Group	Yes	No	Number of Participants
Innovator	60% (3)	40% (2)	5
Early Adopter	37.5% (3)	62.5% (5)	8
Early Majority	25% (1)	75% (3)	4
Late Majority	50% (1)	50% (1)	2
Laggard	0% (0)	0% (0)	0

Findings by Adopter Category						
Demographics						
Total				Total		19
Individual X Organization	Innovator	Early Adopter	Early Majority	Late Majority	Laggard	Number of Participants
Innovator	20% (1)	60% (3)	20% (1)	0% (0)	0% (0)	5
E. Adopter	0% (0)	33.3% (3)	55.6% (5)	11.1% (1)	0% (0)	9
E. Majority	0% (0)	0% (0)	75% (3)	25% (1)	0% (0)	4
L. Majority	0% (0)	0% (0)	50% (1)	50% (1)	0% (0)	2
Laggard	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0
Total						19
Age X Navigation of Avatar		Yes		No		Number of Participants
20-29		0% (0)		100% (1)		1
30-39		0% (0)		100% (3)		3
40-49		50% (2)		50% (2)		4
50-59		30% (3)		70% (7)		10
60+		100% (1)		0% (0)		1
Age X Familiarity of virtual world (Second Life)		Yes		No		Number of Participants
20-29		0% (0)		100% (1)		1
30-39		33.3% (1)		66.7% (2)		3
40-49		50% (2)		50% (2)		4
50-59		40% (4)		60% (6)		10
60+		100% (1)		0% (0)		1

There were five innovators that shared some individual characteristics; sixty percent were female, 40% were 50-59 years of age, 50% had more than 10 years of experience with their company, 60% had navigated a virtual world and had exposure to a virtual world (i.e., Second Life first virtual world in 2003). The only organizational characteristic that produced a pattern was the size of the organization, all innovators worked for a medium (101-999) or jumbo (5000+) organization.

There were eight early adopters and seventy-five percent were female, 87% were 50-59 years of age, 60% had 0-1 years' experience with their company, and 37.5% had navigated a virtual world and had exposure to a virtual world (i.e., Second Life first virtual world in 2003). Early adopters only shared one organizational characteristic, the size of organization (101-999) or jumbo (5000+).

In this study, I uncovered three aggregate dimensions that included (a) changes in the well-being space, (b) acceptability of a virtual world technology application, and (c) adoptability of a virtual world technology application. I uncovered a total of 12 second-order themes categorized within these aggregate dimensions. The second-order themes included (a) greater focus on mental health, (b) greater focus on holistic well-being, (c) compatibility, (d) trialability, (e) relative advantage, (f) observability, (g) complexity, (h) adoption propensity, (i) processes for technology adoption, (j) likelihood of organizational investment, (k) perceived efficacy of the technology, and (l) barriers to adoption. I also discovered patterns and potential priorities of the innovators and early adopters within each of the 12 second order themes. This chapter provided a detailed narrative description of the themes as well as the innovators and early adopters priorities within each theme. The next chapter will discuss the results, implications of the findings, recommendations for practice, and future research.

Chapter Five: Discussion, Conclusion, and Recommendations

Discussion

In 2020, the World Health Organization declared COVID-19 a global pandemic, and the health habits of Americans became staggeringly worse (Cucinotta & Vanelli, 2020). Strategies to mitigate the spread of COVID-19, specifically quarantine and social distancing protocols, exposed a troubling paradox: mandated isolation meant to save lives inadvertently contributed to a decline in the well-being of Americans (Kniffin et al., 2021). Organizations had to navigate the unprecedented environment and find new solutions to challenges arising across many areas of their operations, including employee well-being (Carnevale & Hatak, 2020). Human Resource decision-makers looked for new tools, resources, and applications to recognize and assist with mental, physical, and social well-being challenges for their working populations (Kniffin et al., 2021). Although there has been previous research on virtual world technology for health, the adoption has been slower than expected (Yoon & George, 2013).

However, the working world has changed, and HR decision-makers are more empowered than ever before to learn about and test innovative and new positive technology to meet the needs of their most important asset, their people. The goal of this study was to understand the lived experience of the HR decision-makers before, during, and post COVID-19. Specifically focusing on what factors may influence HR decision-

makers in their assessment of adoptability of positive technology (virtual well-being world) for workplace well-being.

The individual and organizational characteristics of these HR decision-makers may have been factors in their propensity to adopt a virtual well-being world. Seventy percent of HR decision-makers were innovators and early adopters and created a common persona, they were all women, 50+ years old and all had some experience navigating a virtual world and had exposure to a virtual world (i.e., Second Life first virtual world in 2003).

The first aggregate dimension "Changes in the Well-Being Space" mirrored the current research and lived experiences of the HR decision-makers over the past two years (2020-2022). The two themes were a greater focus on mental health due to COVID-19 and a more holistic approach to well-being. COVID-19 helped remove the stigma around mental health and mental health solutions at the workplace. A survey showing 68% of senior HR leaders (40% were CHROs) rated employee well-being and mental health as a top priority, validating the theme as a new emergence (Future Workplace, 2021).

Although the pandemic exacerbated long-standing challenges pertaining to mental well-being, the pandemic also shed light on the importance of increasing access to quality resources and decreasing the stigma around mental health (Future Workplace, 2021). The movement towards a more holistic definition and approach to well-being was in the works prior to the pandemic, but now has become a priority for HR decision-makers. According to the top five workplace well-being trends of 2022, most companies are starting to realize that workplace well-being needs to go beyond physical, and also

prioritize mental health as well as address financial, social, and community well-being (Ascott, 2022).

The acceptability of the virtual well-being world as a new solution to solve the decline in American well-being was bullish since organizations have found themselves in a position where they had no choice but to shift and rethink their plans, investments, and delivery modalities for corporate well-being due to COVID-19 (Kniffin et al., 2021). The HR decision-makers believed that the virtual well-being world had four out of the five characteristics needed to increase adoption described by Rogers' diffusion of innovation theory. The virtual world was compatible with the HR decision-maker needs and interests, they wanted to do a pilot, they believed the relative advantage of this technology was connecting with the younger generation in the workforce. And their perception was this innovation was easy to use. The only characteristic that was not present was observability, most informants had no awareness of a virtual world outside of the gaming industry.

Covid-19 accelerated many changes that were already happening including the expansion of virtual teams, the apparent need for additional modalities, and new ways to work and connect at the office, at home, or in socially distanced work arrangements (Kniffin et al., 2021). HR decision-makers were focused on providing a multimodal approach toward well-being. Leaders were including new and innovative technology to support employees working in the office or remotely (Am et al., 2020).

The third dimension, adoptability of virtual well-being world technology, was the only dimension that truly allowed the informants to speak in a nuanced way of their lived

experience pre, during, and post COVID-19. Human Resources often felt overworked and overloaded during this tumultuous time, but the fact that twenty HR decision-makers were willing to create one hour of free time to learn about the virtual world for workplace well-being with no monetary incentive reveals a true phenomenon. These are the HR decision-makers and here are their stories.

Theme 1: Innovation Propensity

The lived experience of the HR decision-makers over the past few years felt like they were thrust into a situation where they didn't know exactly what to do but had to do something. The HR decision-makers were desperate to provide immediate tangible resources, such as information (e.g., about working from home, prevention of transmission), employee assistance programs, or access to counseling, therapy, and training, as well as doing whatever it took to create some type of social connection and supporting well-being. They started looking for innovative solutions, new opportunities, modalities, and technologies to assist with employee well-being.

Seventy percent of informants identified as innovators and early adopters and thirty percent of the organizations were categorized as innovative and early adopters. This was higher than what is predicted by Rogers's DOI theory. These HR decision-makers had high innovation propensity and were actively looking into the future for new solutions.

Table 5.1: Adoption Category Bell Curve Predicted vs. Bell Curve Actual

Category	Innovator	Early Adopter	Early Majority	Late Majority	Laggard
DOI	2.5%	13.5%	34%	34%	15%
Org	5%	30%	50%	15%	0
Self	25%	45%	20%	10%	0

Hell ya, I want to make a change, this technology is our future. We need to move now, this could also be applied to financial well-being and learning development, and maybe connecting with your telehealth appointment with the Dr. in the virtual world. (1)

My CEO is an early adopter, and the time is right to push forward - right now, I don't have 8 months, the timing is now" "We have to find new solutions to help employees, morale is weakening, the ability to concentrate and the creation of stress in other employees is taking its toll. What can we do, we have to find something to solve the unsolvable, we have to look ahead, not in the rearview mirror, maybe the virtual world is it. (2)

The old way is not working, our employees are priority #1 and we have to act fast looking for new solutions, technology, and applications to address not well-being and the social, something other than Zoom Happy Hour. (20)

Theme 2: Process for Technology Adoption

From wearables to well-being apps, positive technology to help individuals improve their health and well-being is increasing. Big data and AI are transforming the health assessment model, calculating personal risk, and helping to develop personalized health care plans. The global workplace well-being market is innovating swiftly, and market values are increasing. Workplace well-being was valued at $49.81 billion in 2019 and is projected to reach $66.20 billion by 2027, registering a CAGR of 5.9% from 2020 to 2027 (Allied Market Research, 2020). The latest report by Market Research Future (MRFR), revealed the global virtual reality market can escalate to a valuation of USD

101.2 billion by 2027, growing at a high CAGR of 37.4% during the forecast period (2017-2027) (Market Research Future, 2021).

Traditionally, HR decision-makers were required to follow a tedious process or policy when adopting new technology. Typically, this would require a recommendation that would trigger a review of the technology by organizational leaders. However, some of the rules of the committee were more relaxed due to the urgency of helping employees with their well-being.

> No kind of policy or anything if it fits within my budget and fits the culture; there are no rules, this is important we have a blank canvas. (2)
>
> This sounds bad, but it was great….the need for a request for proposals (RFP) dissolved and we were able to go direct to the best option….most of the time it was our existing suppliers, which made it easy. (15)
>
> It almost seems like it's tough for an employer, unless they're super-progressive, to really get on board and say, 'Yes, that's it, let's do it, and but we did, we had too. (18)

Theme 3: Likelihood of Organizational Investment

Nothing has exposed the importance of Human Resources such as the COVID-19 pandemic. HR decision-makers became a sought-after resource for panicked business leaders on the hunt for clarity and alignment. The HR profession has been given no choice but to step up and lead the charge. HR has not just navigated businesses through to the calmer waters with vision and insight, but the industry has also played a pivotal role

in business transformation too. Finally, HR has been able to justify its position at the leadership table, and it is here to stay.

The likelihood of organizational investment was mixed, and many were very optimistic, but others were late adopters. The positive view of technology was an important concept, and the overall sentiment was that well-being was no longer an individual matter, but also an organizational matter. There were some participants who described a low likelihood of organizational investment and referenced uncertainty about efficacy and insufficient innovation propensity of their organization. However, on the other side many believed that the only way to stay competitive was providing solutions to improve well-being and enhance the employee experience.

Yes. If you're really talking as a business about employee experience and engagement, and your employees being the priority in everything, why wouldn't you invest? (18).

I don't believe so. I think it would need to be vetted more with more studies" (9).

Healthcare is revolutionizing its approach, telehealth medicine is on fire, and everyone (patients, providers) is doing it! (5)

Inevitably, in order to survive as a company during we have to accept the world is changing and digital adoption is a necessity, and yeah it will cost more – but our employees are worth it. Without them, we don't have a company. (17)

This is not for me, I believe we need to have in-person connections with our family, friends, co-workers, and doctor. I don't want to talk to my patients in avatar form, that is creepy (7).

Theme 4: Perceived Efficacy

The perceived efficacy was either unknown or had potential. Some HR decision-makers did not have experience with the virtual world nor experience navigating an avatar and it was challenging for them grasp the full potential. However, some HR decision-makers felt optimistic based on the earlier studies proving efficacy and were more optimistic about adopting this positive technology when it becomes available in the marketplace. Others were more confident that there is perceived efficacy and made comments that they would like to try it once it is a full functioning prototype or market ready.

Think conceptually, it's something I can do with the kids and it's something that we have in common and it's great so yeah, I think there's a lot of potential there. could be a home run. (1)

I think there's a huge opportunity and I think it can be really cool um yeah so isn't it really like, an interesting healthcare extension. (18)

PT at home, like you know when people can't travel, you can create the virtual office and walk right in there and have it so real it's just like I'm there. if you choose your diffusion of innovation right you got to find the right employers first. that's all I'm saying right that the well economy is alive and growing right, you create an experience, where you're appealing because the possibilities are endless right, so I think the chance to shape, that is where I am now. (4)

Well, so actually that mental well-being and even before you got to the yoga area I just thought about just the fact of walking on the beach and the mindfulness of

that brings to a person. That experience can help someone. That experience in

itself can help someone (9).

Theme 5: Barrier to Adoption

The overall sentiment was there are some barriers that will have to be addressed

before major adoption happens. The main barriers and disadvantages were that many

participants could not completely understand the Proteus Effect and how what they learn

in the virtual world, they must go to the virtual world and then do everything again in the

real world. The other big barrier to adoption was the time and generational differences.

It is a barrier that I have to do things twice, I have to go to the virtual world, but

then I have to go to the real world to practice, that takes a lot of time, but on the

other side, if I went to my workplace WW meeting, that takes time and I still have

to implement what I learned, hmm maybe it is not a barrier, I don't know. I need

to learn more and try it. (16)

There may be a lot of risk around technology and healthcare plans, and they are

rigid. (6)

The older generations, mmm I don't think so, but gen Z will be onboard. (4)

I think that when you take away the actual [in-person] human interaction, even if

there's a human on the other side [of the VW], I think that it leads to people—it

makes them feel much more isolated. (7)

I think that it can be too much of a distraction and take away from actual

connections. (17)

Needs to obviously tie into our strategy and employer of choice and cybersecurity. (9)

How can you make virtual worlds really compelling so they can see the benefit? – it is like face-to-face but less time, and anywhere and anytime. You can meet with your doctor, PT, life coach, and your friend. (13)

Conclusion

The zeitgeist of 2020–2022 will be associated with COVID-19; however, there are many silver linings if we look. The focus on corporate well-being will not dimmish but will rather become an even more important part of the employee experience. The HR decision-makers are interested and eager to try the virtual well-being world. This study revealed that the lived experience of the HR decision-makers pre, during and post pandemic was challenging, but that there were new opportunities and new technology that has potential to not only solve for mental and physical well-being, but also social well-being.

There were numerous factors may increase the likelihood of adopting a virtual well-being world for workplace well-being, some obvious and some covert. Many HR decision-makers that believed web 3.0 would change everything, both personal and professional and they were all willing to learn and be a part of the change. The fact that seventy percent of the informants were innovators and early adopters versus the hypothesized 16% according to Rogers indicates a high propensity to adopt. The adage that HR is all about compliance is certainly not the case anymore.

A second factor that may increase the likelihood of potential adoptability of the virtual well-being world was the company process for technology adoption. Although most companies had a strict process for technology adoption, many HR decision makers were provided more autonomy to make decisions during this tumultuous time. And although the relaxed process may not last forever, the HR decision-makers were already embracing the HR digital transformation and were motivated to expand this to well-being.

Another factor that may increase the likelihood of adoption of the virtual well-being world was the likelihood of an organizational investment. Most of the HR decision-makers had a positive view of digitization, through their recent experiences with COVID-19, they saw an opportunity to bring the digitization to well-being. One informant shared that more than 85% of HR professionals surveyed said that technology "has strengthened their contribution to corporate success," and more than 80% reported that their company's investment in technology "will allow them to maintain or grow their headcount and increase employee productivity."

Perceived efficacy was also a factor that may increase the likelihood adoptability of a virtual world. These HR decision-makers believed there was a there an opportunity to be on the cutting edge. However, even though the virtual well-being world was only in alpha phase, the HR decision-makers believed this solution could be effective and efficient for employees.

The last factor that may influence the likelihood of adopting the virtual well-being world was the opportunity to be a part of the digitization of well-being in the workplace

to help employees become more productive, more efficient, but most importantly becoming healthy and well.

With any innovation there are barriers to entry and barriers to adopt. Many HR decision-makers seemed cautious of how the virtual and real world would blur the lines of reality versus virtual reality, but also were optimistic about the art of what's possible with this technology. A second barrier that emerged was resistance from employees. The HR decision-makers shared that many of their employees would be skeptics and would not engage. However, the HR decision-makers also indicated that web 3.0 may change everything.

By nature, humans are averse to change, and a technological shift in the workplace can be challenging for employees, making it critical to get employees involved in the "new normal", inclusive of innovative tech. HR decision-makers emphasized the belief that if the employees were part of the change, they would become advocates and eventually evangelists of the technology.

And although transferability was a major barrier for some informants because they just could not understand how anyone would spend time in the virtual world, and then must spend additional time practicing these new health behaviors in the real world. It is really not that much different than the old ways of in-person learning; employees to travel to a weight management class learn about the content and strategies from a professional and then go home and practicing the new learned behaviors. The HR innovators and early adopters believed this was like F2F, but the virtual world would not

only eliminate travel time, but the results had potential to be much more effective due to the Proteus Effect.

Technology is going to continually evolve and become more ubiquitous in our lives. This study creates a new opportunity for developers, solution providers, and employers to work together and meet the needs of our brave new world. The time is now for developers understanding of the instrumental value of how positive technology can enhance the importance of human activities and experience (Hassenzahl, 2013; Yoo, 2010). This will not only help the designers focus on user goals (Pruitt & Grudin, 2003); it allows multidisciplinary teams to incorporate the user needs at an early stage (Nieters et al., 2007). The challenge for solution providers is the need to increase observability of this technology outside of the gaming industry, and perhaps use the identified persona when marketing. And last but not least, the employer must continual learn about and provide the best and most effective programs to support their most important asset, their employees.

Limitations

This study, like all research, has limitations. Rogers (2010) claimed that the nature of the social system affects individuals' innovativeness, which is the main criterion for categorizing adopters. Many of the informants may not have had a deep understanding of organizational complexities: bureaucracy, resources, and the social influence necessary to make an acceptance and adoption decision. There was only one innovator that worked for an innovative company, and she was the only informant with high social capital within the C-suite including full decision-making authority.

81

The virtual well-being world was in the Alpha phase and the HR decision-makers saw the demo but could not try the technology. Each organization was from a different industry, was a different size, and had different technology decision-making processes making it hard to identify a pattern that could be a factor of increasing likelihood of adoption.

Lastly, the seventy percent of innovators and early adopters and no laggards may indicate some bias? Could there have been a positive bias about being labeled an innovator/early adopter, and a negative bias being labeled a laggard.

Recommendations for Practice and Future Research

This study contributes to the existing literature by demonstrating how remote working with the use of newly implemented technologies may be able to improve employees' well-being post pandemic. The immersive industry is changing and shifting rapidly with improved equipment and new breakthroughs in research being published. The healthcare industry is accepting and adopting new innovative and immersive technology and is implementing it rapidly in all areas from education, surgery, rehabilitation, and therapy. As this technology becomes mainstream, more affordable, and more observable, there is a predictable pattern that the well-being industry will follow healthcare and adopt this technology. However, it may take time, since American society focuses on sick care, and disease prevention is often scarce.

However, the virtual well-being world can also be used for different populations outside of corporate well-being. There is a big opportunity to research if this modality would be useful for chronic conditions patients (i.e., fibromyalgia). These individuals

need healthy habits and social connection and a sense of community with others going

through similar challenges. In addition, a compelling research opportunity exists to test

and validate effectiveness, efficiency, and affordability of virtual world technology by

doing a 4 X 4 analysis using four different modalities for well-being behavior change:

face to face, online apps, virtual reality with headset, and virtual world applications using

avatar technology. The findings may not only inform research, but also contribute

significantly to practice and ultimately to arguably the most important stakeholder, the

individual employee.

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Appendix A

Virtual Well-being World Video
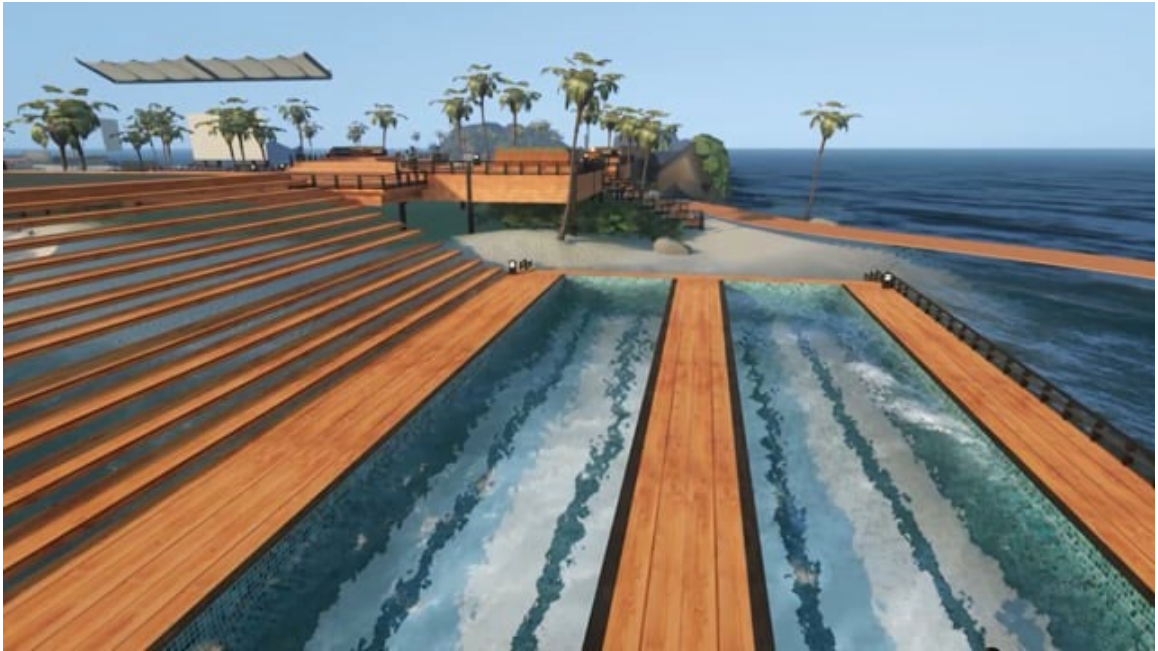
Appendix B

PowerPoint Presentation (Double Click to play)

Where Virtual Wellbeing Becomes a Reality

COLLEEN M. REILLY MBA/MSM/PHD STUDENT

SVP BUSINESS DEVELOPMENT, IMMERSIVEWORLDS

Online Pre-Survey Questions

Demographics (Frequencies) Pre-survey

1. How many years have you been with your organization? (0–1, 2–5, 6–10, over 10)

2. What is your gender? (female, male, do not want to disclose)

3. What is your age? (20–29), (30–39), (40–49), (50–59), (60+)

4. What is your position title with the company? (text box)

5. What is your company's industry?

   o   Transportation

   o   Technology

   o   Telecommunications

   o   Construction

   o   Agriculture

   o   Education

   o   Healthcare

   o   Food

   o   Retail

   o   Entertainment

   o   Energy

   o   Manufacturing

   o   Other _____

6. Size of organization? (small [>100], medium [101–1000], large [1001–5000], jumbo [5000+])

7. Years of well-being program in existence?

   o (0–1, 2–5, 6–10, over 10)

8. If yes, prioritize the well-being program's top three outcomes priorities.

   o Save on healthcare costs

   o Recruit and retain top talent

   o Create a culture of well-being

   o Decrease stress

   o Increase productivity

   o Improve firm performance

   o Enhance innovation

   o Elevate company brand

   o Develop meaning and purpose through their job

   o Other (text box)

9. What well-being programs are available to your employees?

   o Onsite Physical Well-being programs

   o Online Physical Well-being programs and Apps (Fitness trackers, nutrition trackers)

   o Onsite Mental Well-being programs (onsite therapists, mediation groups)

   o Online Mental Well-being programs and Apps (i.e., Calm, Headspace)

- Onsite Social Well-being Programs (social activities like volunteering, relationships with coworkers, inclusivity programs, work-life balance arrangements)

- Online Social Well-being programs (Zoom happy-hours, online networking and socializing, inclusivity programs, work-life balance arrangements)

8. Do you have a strategy to address social isolation due to COVID-19?

- No

- Yes

- We are working on it

9. Have you ever navigated an avatar through a virtual world? (Yes/No)

10. Are you familiar with a virtual world (such as Second Life)? (Yes/No)

Appendix D

Qualitative Interview Questions Part 1

1. How do you define workplace well-being?

2. What are your well-being priorities?

3. What is the level of social interaction at work due to COVID-19?

4. What is working? Are there plans to enhance social connections?

5. What is your understanding of the digitization of well-being? What is your familiarity

    with virtual worlds and avatar technology?

Appendix E

Qualitative Interview Questions Part 2

1. Compatibility: What do you think of this Virtual World as an integrated solution (physical, mental, social)? Does this fit your needs, interests, values, tools, or culture?

2. Trialability: What features of this world do you think might work in your organization (all of them or just some)? The virtual world has many elements, and your integrated framework has different components of well-being; would all of them work, would some work; what is important to you? Would you ever be interested in trying it out as a pilot? Would you be more interested if it was offered through a health plan or well-being vendor?

3. Relative advantage: Do you see this Virtual World modality having any advantage over current well-being offerings; are there disadvantages; what is your perceived efficacy?

4. Observability: Can you describe what you have seen and heard about the Virtual World? Did the announcement of Meta increase your awareness of this technology?

5. Simplicity/Complexity: What is your perception of ease of use?

6. What is the process for making technology adoption decisions for you and the organization?

7. What adopter group do you identify with?

8. What adopter group do you believe your organization falls in?

Table E.1: Rogers Adopter Categories

Adopter category	Definition
Innovators	Innovators are willing to take risks, have the highest social status, have financial liquidity, are social, and have the closest contact to scientific sources and interaction with other innovators. Their risk tolerance allows them to adopt technologies that may ultimately fail. Financial resources help absorb these failures.
Early adopters	These individuals have the highest degree of opinion leadership among the adopter categories. Early adopters have a higher social status, financial liquidity, advanced education and are more socially forward than late adopters. They are more discreet in adoption choices than innovators. They use the judicious choice of adoption to help them maintain a central communication position.
Early Majority	They adopt an innovation after a varying degree of time that is significantly longer than the innovators and early adopters. The early majority have above average social status, contact with early adopters, and seldom hold positions of opinion leadership in a system.
Late Majority	They adopt an innovation after the average participant. These individuals approach an innovation with a high degree of skepticism after the majority of society has adopted the innovation. The Late Majority are typically skeptical about an innovation, have below-average social status, little financial liquidity, are in contact with others in the late majority and early majority, and have little opinion leadership.
Laggards	They are the last to adopt an innovation. Unlike some of the previous categories, individuals in this category show little to no opinion leadership. These individuals typically have an aversion to change agents. Laggards tend to focus on "traditions," lowest social status, lowest financial liquidity, oldest among adopters, and in contact with only family and close friends.

Table E.2: Positive Technology; Well-being factors for positive computing

Determinants of Personal Experience	Key Factors	Literature and Theory	Strategies (Augmentation, Structuration and Replacement)	Methods and Measures
Emotional Quality (Hedonic Level)	Positive Emotions	• Building & Broadening Effect (Fredrickson); • Writing Therapy (Pennebaker) • Hedonic Psychology (Kahneman);	Writing Therapy; Exposure Therapy and Relaxation; Savouring; Positive ruminating; Reframing Compassion & meditation.	PANAS scales; General measures such as STAI, BDS, SWLS and QoL scales.
	Mindfulness	• Mindfulness based Stress Reduction (Kabat Zinn);	Mindfulness meditation; MBSR strategies; MBCT strategies.	MAAS; Freiburg Mindfulness Inventory.
	Resilience	• Psychology of resilience (Seligman, Keyes); • Building & Broadening Effect (Fredrickson).	Positive psychology interventions; SuperBetter.	Resilience Scale.
Engagement & Actualization (Eudaimonic Level)	Engagement & Presence	• Flow Theory (Csikszentmihalyi). • Presence (Riva & Waterworth) • Patient Engagement (Graffigna, Barello & Riva)	Challenge and Skills; Intrinsic and extrinsic rewards;	Flow Scales; Experiential Sampling Method
	Self-Efficacy & Motivation	• Self-Efficacy (Bandura) • Transtheoretical Model of change (Prochaska & DiClemente) • Self-determination Theory (Ryan & Deci);	Life summary; Online CBT study; Technology Mediated Reflection.	General Self-Efficacy Scale; Transtheoretical Model Questionnaire.
Connectedness (Social/ Interpersonal level)	Networked Flow	• Networked Flow (Gaggioli & Riva) • Psychological Selection (Delle Fave, Inghilleri, Massimini)	Presence and Social Presence Transformation of Flow	Social Network Analysis
	Gratitude	Psychology of Gratitude (Emmons & McCullough).	Gratitude visit; Gratitude journal.	Gratitude Questionnaire.
	Empathy	• Emotional Intelligence (Salovey & Mayer; Goleman); • Affective and Cognitive empathy (Gerdes et al; Singer); • Compassion Focused Therapy (Paul Gilbert).	Role playing; Perspective taking; Emotion recognition training.	EQ; InterpersonalReactivity Index; Children's Empathic Attitudes Questionnaire.
	Altruism	Empathy Altruism (Bateson).	Prosocial games; Role playing helping behavior.	Self-compassion Scale; Prosocial Orientation Scale; Hostile Attribution Bias Questionnaire.

Note. From Villani et al. (2016).