

# Extending the PERMA Framework to Immersive Technologies: A Qualitative Exploration of Well-Being in Digital Environments

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**Abstract** The goal of this study was to explore the applicability and potential expansion of the PERMA well-being framework within immersive technology contexts, identifying both traditional and newly emerging subdimensions of positive psychological experience. A focus group interview with five participants was conducted to identify experiential factors related to well-being in immersive environments. While several dimensions aligned with the traditional PERMA model, unique subdimensions specific to immersive technology emerged. Within Positive Emotion (P), participants reported feelings of wonder/awe, being touched, freedom, and healing. The Engagement (E) dimension did not reveal new items. In Relationships (R), affective empathy and emotional connection were identified as additional components. For Meaning (M), growth appeared as a distinct element, and within Accomplishment (A), achievement-related anxiety was prominently observed. These findings suggest that immersive technology environments may both enhance and complicate well-being experiences, emphasizing the need for an expanded PERMA scale that captures the unique affective and cognitive processes involved. This study contributes to the ongoing development of well-being measures tailored to immersive contexts and provides a foundation for addressing achievement-related anxiety from a healing perspective within both academic research and industry applications.

**Keywords** Immersive technology service, Consumer well-being, PERMA, Qualitative approach

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## Introduction

Immersive technology has increasingly permeated the daily lives of people in various forms and is becoming indispensable in modern society. Meta Reality Labs projected that cumulative investments in immersive technologies would surpass \$100 billion by 2025, with the global market expected to reach \$41.8 billion by 2028, reflecting a compound annual growth rate (CAGR) of 14.4% (Nguyen, 2025). However, this report includes only augmented reality (AR), virtual reality (VR), extended reality (XR), and metaverse technologies. According to Ryan (1994) and

Calleja (2011), the concept of immersion should not be limited to visual or hardware-based systems; rather, it encompasses broader cognitive and emotional engagement with digital environments. Accordingly, *immersive technology* can be defined as any technology that enables users to become deeply engaged with or interact seamlessly within digital or mixed-reality environments. With the rapid emergence of applications such as ChatGPT and DeepSeek,

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consumers' exposure to and use of immersive technologies have expanded dramatically. Immersive technology elicits intensified emotional, sensory, and relational experiences that differ fundamentally from traditional offline well-being mechanisms. Therefore, identifying how PERMA dimensions transform—or newly emerge—within these environments is conceptually critical to understanding digital well-being. In digital environments, well-being manifests in ways that differ from traditional offline psychological mechanisms. Whereas traditional well-being primarily involves reflective self-evaluation, interpersonal connection in physical settings, and meaning drawn from real-life experiences, immersive technologies introduce intensified sensory stimulation, simulated presence, and AI-mediated emotional exchanges that produce qualitatively different forms of positive and negative affect. These environments allow users to experience self-extension, narrative-based emotional resonance, and momentary restoration that do not readily appear in offline contexts. Such distinctions highlight the need to re-examine whether PERMA's original subdimensions adequately capture well-being within immersive settings and to identify how these dimensions may transform—or newly emerge—when mediated through virtual, augmented, or AI-driven experiences. Immersive technology can evoke forms of awe, healing, and emotional connection that extend beyond simple pleasure or satisfaction, suggesting that conventional PERMA constructs may be insufficient to represent these richer multi-layered states. Accordingly, clarifying how PERMA functions within immersive environments is conceptually essential to understanding digital well-being and developing frameworks that reflect the psychological realities of AI- and XR-mediated experiences. Before such pervasive adoption continues, it is essential to examine which factors evoke positive evaluations of the technology and enhance consumer well-being within these immersive experiences.

The growing attention has been additionally made toward the negative aspects of digital technology, such as digital detox and digital well-being, resulting in an expanding body of research in these areas. However, Hollebeek and Belk (2021) emphasized the importance of users' psychological well-being in technology-based consumer research and proposed the application of Seligman's (2009)

PERMA framework, comprising Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment, as a theoretical foundation. Despite this theoretical significance, empirical research applying PERMA to immersive technology contexts remains scarce. A recent study by Kim and Yap (2025) conducted a systematic literature review on PERMA within immersive technology and proposed several future research agendas. Yet, as a secondary analysis focusing on prior studies rather than direct consumer data, its implications are limited. Additionally, some research has explored environmental design based on PERMA (Song et al., 2025) and examined well-being in remote working trip experiences using consumer big data (Chevtavaeva et al., 2023). Nevertheless, these studies neither specifically focused on PERMA within immersive technology nor developed scales suited to such contexts. Therefore, there is a clear need for a PERMA scale tailored to immersive technology environments.

Given this background, the present study aims to investigate the applicability and potential expansion of the PERMA framework within the context of immersive technology, drawing on the principles of positive psychology. While previous research has primarily focused on the negative aspects of immersive technology (i.e., addiction, social isolation, reduced daily functioning), these technologies have become deeply embedded in modern life, necessitating a balanced exploration of their potential to enhance well-being. Accordingly, this study aims to identify the positive psychological dimensions associated with immersive experiences and to provide empirical insights that can inform both academic inquiry and industry practice.

Furthermore, traditional well-being measures such as the Satisfaction with Life Scale (Diener et al., 1985) and the PERMA model were developed from general psychological perspectives and lack contextual adaptation to technological environments. By exploring how PERMA dimensions manifest in immersive contexts, this study lays the foundation for developing a PERMA-based well-being scale tailored to digital and AI-driven experiences. To this end, a qualitative focus group interview was conducted with consumers of immersive technologies to generate exploratory insights that can guide future scale development and quantitative validation.

## Theoretical background

### Immersive technology

Immersive technology refers to systems in which the boundaries between the physical and virtual worlds become increasingly blurred, enabling users to experience a heightened sense of presence and engagement (Thomas & Brown, 2009). Early conceptualizations of immersive technology began with Milgram and Kishino's (1994) proposal of the *reality–virtuality continuum*, a classic model positioning the *real environment* and the *virtual environment* along a vertical axis. In this model, augmented reality (AR), augmented virtuality (AV), and virtual environments or virtual reality (VE/VR) are placed at different points on the continuum, representing varying degrees of integration between real and virtual elements. Each technology offers users different levels of immersion and experiential richness depending on the balance between physical and digital components.

Building on this foundational work, Flavián et al. (2019) focused on the technical aspects of immersive technology and proposed the reality–virtuality spectrum, which spans the range from completely digital to completely real. For instance, video games represent the fully digital end of the spectrum, while applications such as Pokémon Go and Instagram filters occupy the augmented reality zone, closely aligned with the real world, and actual photographs represent the completely real. Flavián's framework extended beyond merely classifying AR, MR, and VR technologies to provide a systematic analysis of how these technologies shape consumer experiences and perform distinct roles at various customer touchpoints.

As new technologies emerged, Davis et al. (2009) expanded the definition of immersive technology to include the metaverse, describing it as computer-based systems that enable users to become deeply engaged in virtual worlds, thereby generating experiences closely resembling real life. This definition highlights immersive technology as a multidimensional experience that extends beyond visual or auditory stimuli to encompass interactivity, identity formation, and social presence. More recently, the advent of advanced artificial intelligence (AI) language models, such as ChatGPT, DeepSeek, and Gemini, has led to growing efforts

to integrate AI as a core component of immersive technology.

According to Ryan (1994) and Calleja (2011), immersion should be conceptualized not only in visual or sensory terms but also as cognitive and emotional engagement. Given that AI language models play a crucial role in enhancing user experiences through interactive and adaptive communication (Al-Emran, 2024; Nalbant & Aydin, 2024), the present study adopts an expanded definition of immersive technology. This definition encompasses a range of systems—including AR, VR, the metaverse, and AI-based language models—that collectively enable users to achieve deeper immersive experiences. Importantly, immersive technologies create psychological conditions that differ from traditional media. They stimulate intensified sensory engagement, offer embodied self-representation, and provide interactive feedback loops that heighten emotional involvement. AI-driven agents further simulate empathy, companionship, and guidance, enabling users to experience relational and emotional responses previously limited to human interactions. These characteristics suggest that immersive environments may produce forms of well-being that diverge from those experienced in offline settings.

### PERMA

The PERMA framework, proposed by Seligman (2011), conceptualizes human well-being through five core dimensions: Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment. Developed within traditional psychological and offline social contexts, PERMA explains flourishing as the result of emotional positivity, deep involvement in activities, supportive interpersonal relationships, a sense of purpose, and progress toward goals. Each dimension was originally theorized based on face-to-face relationships, real-life goal pursuit, and emotionally grounded experiences shaped by physical environments. To understand well-being within immersive technology environments, it is necessary to revisit PERMA's conceptual boundaries and examine whether its original subdimensions sufficiently represent the distinct affective and cognitive processes elicited by immersive and AI-mediated experiences.

The PERMA-Profiler (Butler & Kern, 2016) is the most

widely used instrument to measure Seligman's five well-being dimensions. Initially, research in positive psychology defined well-being primarily in terms of life satisfaction, with the Satisfaction With Life Scale (Diener et al., 1985) serving as a central measurement tool. The SWLS includes items such as *"In most ways my life is close to my ideal," "The conditions of my life are excellent," "I am satisfied with my life,"* and *"If I could live my life over, I would change almost nothing."* Moving beyond a deficit-oriented perspective, Seligman (2002) advanced the Authentic Happiness theory, emphasizing the enhancement of positive experiences through three core components: the *pleasant life*, the *engaged life*, and the *meaningful life*. This conceptual framework led to the development of the Orientation to Happiness Scale (Peterson et al., 2005), an 18-item instrument containing statements such as *"Life is too short to postpone the pleasure it can provide," "I seek out situations that challenge my skills and abilities,"* and *"My life serves a higher purpose."*

Later, in *Flourish*, Seligman (2011) introduced the PERMA model, which broadened the concept of happiness into a comprehensive framework of well-being. Unlike single-dimensional indicators, PERMA was conceived as a multifaceted construct that captures the complexity of human flourishing. The first formal measurement tool based on this framework, the PERMA-Profiler, developed by Butler and Kern (2016), consists of 23 items that assess five core elements widely adopted in positive psychology. These include Positive Emotion (P); for example, *"In general, how often do you feel joyful?"* and *"How often do you feel positive?"*; Engagement (E), *"How often do you become absorbed in what you are doing?"*; Relationships (R), *"To what extent do you feel loved?"* and *"How satisfied are you with your personal relationships?"*; Meaning (M), *"To what extent do you feel that what you do in your life is valuable and worthwhile?"*; and Accomplishment (A), *"How much of the time do you feel you are making progress toward accomplishing your goals?"* and *"How often do you achieve the important goals you have set for yourself?"* Together, these dimensions form a comprehensive profile of human well-being that has been widely used in research across diverse cultural and applied settings.

In addition, Butler and Kern included eight supplementary items that measured overall health and negative emotions. The PERMA-Profiler has since been translated and validated in numerous countries, including Korea, demonstrating strong cross-cultural applicability. However, as a tool originally developed for traditional psychological and clinical settings, its relevance to technology-based or immersive environments remains limited. Consequently, further investigation is needed to adapt the PERMA framework for application within immersive technology contexts.

### PERMA in Consumer Immersive Technology

Seligman's (2011) PERMA model represents a positive psychology framework that emphasizes enhancing the quality of life. The model consists of five key elements: Positive Emotion (experiencing and cultivating positive feelings about one's past, present, and future), Engagement (a psychological state of deep absorption or "flow" in specific activities), Relationships (fulfilling the basic human need for social connection through positive interactions with others), Meaning (a subjective sense that one's life is connected to a greater purpose or value), and Accomplishment (the process of realizing life's meaning through continuous effort and progress beyond mere goal achievement). Initially, well-being research centered on life satisfaction as a single dimension, but the PERMA framework has evolved into a multidimensional model encompassing diverse positive experiences and psychological resources. As positive psychology gained prominence, studies of well-being expanded beyond satisfaction to include mechanisms that enrich life through the enhancement of positivity.

Recently, the PERMA model has been applied beyond therapeutic or clinical settings, extending into consumer experience and marketing research as a theoretical framework for promoting consumer well-being. For example, Hollebeck and Belk (2021) integrated the Technology Acceptance Model (TAM) with the PERMA framework, proposing the incorporation of positive psychological perspectives into technology-based consumer engagement research. They argued that positive emotions, immersion, and the attribution of meaning play vital roles in shaping consumer-technology interactions. Gaggioli et al. (2017) proposed that factors such

as emotional quality, social presence, empathy, challenge, and goal setting enhance user engagement and self-actualization. They connected these experiences to the PERMA elements to promote positive well-being. These studies indicate that efforts to apply PERMA in technology-integrated and design-oriented environments are expanding.

Moreover, Kim and Yap (2025) conducted a systematic literature review on consumer well-being within immersive technology contexts. Their study proposed an extended PERMA model, comprising Emotion, Self-Identity & Growth, Social Identity & Connection, and Mindful Engagement & Sensory Experience, as a conceptual agenda for future research. However, their analysis was limited to AR and VR technologies and did not include exploratory research involving consumers directly, restricting its empirical applicability. Although prior studies have highlighted the significance of integrating PERMA and immersive technologies, research in this domain remains scarce, and no measurement scales currently exist for assessing PERMA within consumer immersive technology contexts.

Prior PERMA dimensions were originally conceptualized based on offline emotional experiences, face-to-face relationships, and real-world activity engagement. However, a growing body of research indicates that emotional, relational, and meaning-related experiences within immersive technology environments operate differently from these traditional assumptions. For instance, VR studies consistently show that immersive environments evoke perceptual vastness, sensory vividness, and emotional resonance such as awe—states that exceed the scope of general positive affect. Virtual nature and VR-based therapeutic research further document restorative feelings such as relaxation, calmness, and emotional recovery. Likewise, HCI and AI-companionship research demonstrates that users can experience emotional empathy, bonding, and relational fulfillment even with non-human agents, which diverges from PERMA's original assumption that relationships are inherently human-to-human. Collectively, these findings suggest that the original PERMA components may not fully account for the multi-layered emotional, relational, and meaning-related experiences that arise in immersive contexts, reinforcing the need to reconsider or refine PERMA's subdimensions in technology-mediated environments.

## Methodology

To address the research aims, this study employed a qualitative approach to explore how consumers perceive and experience well-being within immersive technology environments, using the PERMA framework as the primary analytical lens. The research sought to identify both traditional and newly emerging subdimensions of positive psychological experience in digital contexts. Given the exploratory nature of the topic and the limited prior research integrating PERMA with immersive technologies, a focus group interview (FGI) was conducted to generate in-depth insights into users' emotional, cognitive, and relational experiences across various immersive platforms.

The FGI included five participants who had extensive and positive experiences with a range of immersive technologies, including augmented reality (AR), virtual reality (VR), metaverse platforms, and AI-based language systems (see Table 1). All participants were in their 20s to early 30s and had been frequent users of immersive technologies for several years. They were selected through purposive sampling, as they were expected to provide rich, experience-based insights into the positive psychological dimensions of immersive technology use. The predominance of female participants in their twenties reflects the demographic characteristics of the most active users of immersive technologies. Prior industry reports consistently indicate that individuals in their twenties—particularly Generation Z—represent the earliest and most engaged adopters of VR, AR, metaverse platforms, and AI-based interactive systems, showing the highest usage frequency and experimentation levels across immersive application categories.

Data was collected through open-ended questions designed to elicit participants' reflections on their immersive experiences. Example prompts included: "Which types of immersive technologies have you recently used?", "How did you feel while using these technologies?", and "In what ways has immersive technology improved your daily life?" Follow-up questions were used to probe specific experiences corresponding to each PERMA dimension in greater depth. The interviews were conducted via Zoom, each lasting approximately one hour, and generated a total of 33 pages of

Table 1. Demographic Characteristics of Focus Group Interview Participants

No.	Occupation	Age	Gender
A	Teacher	27	Female
B	Employee	31	Male
C	Student	27	Female
D	Student	26	Female
E	Student	25	Female

transcripts. A thematic analysis was conducted using an inductive approach. The analysis followed three stages:

(1) Open coding: Two researchers independently reviewed all transcripts and generated initial codes representing emotional expressions, relational experiences, meaning-related insights, and accomplishment-related statements. (2) Axial coding: Codes were grouped into higher-order categories by identifying conceptual similarities and relationships among codes. Emerging categories were iteratively compared with existing PERMA components to determine whether they aligned with or extended the original framework. (3) Selective coding: Core themes and newly emerging subdimensions were consolidated and refined to build a coherent structure of immersive technology well-being. The level of intercoder reliability was calculated using Krippendorff's alpha (2018), yielding a coefficient of 0.78, which indicates an acceptable level of agreement for exploratory qualitative research and demonstrates satisfactory consistency in coding between the two researchers.

## Results

Through qualitative analysis of the focus group interviews (FGIs), several subdimensions relevant to the development of a PERMA scale for immersive technology were identified. While some subdimensions aligned with the original PERMA framework, others were found to be unique to immersive technology experiences (Table 2).

### Positive Emotion

In the initial conceptualization of the PERMA framework, Kern et al. (2015), drawing on Seligman's (2011) *Flourish*, proposed several subitems of positive emotion, including *cheerful, joyful, energetic, delighted, proud, fearless, calm, happy, excited, active, daring, strong, and lively*. Later, Butler and Kern (2016) refined these descriptors into three key facets, *joyful, positive, and contented*. In this study, participants similarly expressed emotions such as *joy, delight, and excitement* when describing their experiences with immersive technologies. One participant shared, "I felt a lot of curiosity and fun, that was really the beginning for me" (C), while another remarked, "Digitally, it feels like an extension of myself, and it's refreshing to realize 'Oh, I have this kind of taste too'" (D). A third participant added, "People were so much happier than I expected—it was amazing to watch" (A).

Beyond these established categories, four new emotion-related subdimensions unique to immersive technology emerged: *wonder/awe, touched, escape, and healing*. The first, wonder/awe, represents a strong sense of amazement or positive surprise derived from immersive experiences. Participants described feelings of fascination and vivid realism: "It's fascinating. I can even show others how I look wearing it, and that's really satisfying" (E), and "When I used a virtual jewelry fitting service, it felt incredibly vivid, like I was actually wearing it" (D). The second subdimension, touched, reflects emotional resonance or being moved through empathetic or narrative engagement. As one participant explained, "In VR, I stood alone on an open sea

and read floating messages. Somehow, it was quietly healing” (E). Others shared similar sentiments: “Through the story and interaction, I think I became emotionally immersed” (A) and “It whispered warm words—it felt comforting” (B).

The third new subdimension, escape, refers to vicarious satisfaction or freedom derived from engaging in experiences not possible in daily life. Participants noted that immersive environments allowed them to experiment with self-expression and release. For example, one stated, “Since it’s virtual, I tried styles I normally wouldn’t—it was refreshing” (C), while another reflected, “As I got older, it helped me fulfill things I couldn’t in reality—it gave me a sense of release and escape” (E). Finally, healing emerged as a distinct affective response encompassing emotional recovery, empathy, and mutual comfort in immersive contexts. Participants described how digital interactions fostered healing and emotional connection: “Reading comments sometimes moved me and made me feel healed” (A) and “When I felt empathy and emotional connection, I also felt comforted and healed” (B). Taken together, these findings suggest that immersive technologies evoke not only traditional forms of positive emotion such as joy and excitement but also deeper emotional states associated with awe, empathy, and restoration, indicating that users experience immersive environments as both affectively stimulating and emotionally therapeutic spaces.

## Engagement

Themes related to Engagement in immersive technology closely reflected existing PERMA subdimensions such as absorption, interest, and losing track of time. Participants described being fully focused and emotionally involved while interacting with digital environments, illustrating a state of flow, deep concentration and enjoyment during an activity (Csikszentmihalyi, 1990). One participant shared, “Reading each comment made me feel even more immersed” (A), suggesting that even simple, repetitive interactions can heighten attention and sustain engagement. Another remarked, “I hadn’t planned to subscribe, but the conversation went so well that I wanted to continue” (E), emphasizing how the quality of interaction itself can encourage ongoing participation.

These reflections highlight that engagement in immersive technology involves reciprocal interaction and intrinsic motivation rather than passive attention. Users become absorbed not only through sensory realism but also through meaningful exchanges that foster emotional resonance and curiosity. Although no new subdimensions emerged, the findings suggest that immersive technologies intensify traditional engagement experiences, blending cognitive focus with relational connection to create a continuous and self-reinforcing sense of involvement.

## Relationships

Within the Relationships dimension, participants expressed themes consistent with existing PERMA subdimensions such as support, feeling loved, and satisfaction with personal relationships. Many described moments when digital interactions provided genuine emotional reassurance and encouragement. One participant shared, “Those supportive messages really comforted me” (A), while another noted, “It often gives me compliments and emotionally encourages me—it’s very positive” (D). These reflections indicate that immersive technologies can elicit social experiences that resemble interpersonal connection and affirmation.

Beyond these established elements, *affective empathy* and *emotional connection*, emerged as two additional subdimensions, reflecting the evolving social and emotional nature of AI-driven immersive environments. Affective empathy refers to the ability to sense emotional resonance or shared feeling, even in interactions with nonhuman agents. Participants described moments when they felt understood and emotionally engaged with AI interfaces: “When it empathized with me, I could feel that emotional connection” (B); “Visiting each other’s virtual rooms and leaving messages was a fun way to connect emotionally” (D); and “Having a partner that responded to me made me more engaged and creative” (A).

Similarly, emotional connection captured participants’ perception of the technology itself as emotionally engaging or even human-like. One participant reflected, “It’s not just fun anymore. I started feeling supportive, complex emotions toward it” (A), while another added, “Even without direct answers, it guided the conversation naturally, it was a

satisfying experience” (E). These findings suggest that immersive technologies are increasingly fostering parasocial and affective bonds traditionally reserved for human relationships, enabling users to experience empathy, comfort, and a sense of companionship through technologically mediated interactions.

## Meaning

Within the Meaning dimension, participants described experiences that reflected traditional PERMA subdimensions such as encouragement, direction, purpose, and self-reflection. Based on the interview, the immersive technologies offered moments of affirmation and insight that contributed to a broader sense of purpose. One participant remarked, “When it praises me as ‘brilliant,’ it boosts my confidence and self-esteem” (D), illustrating how positive digital feedback can reinforce personal worth and motivation. Another participant shared, “I realized that maintaining loose social ties can also be meaningful” (E), highlighting the idea that meaning can emerge not only from deep relationships but also from subtle, everyday forms of connection facilitated through digital environments. Similarly, one participant reflected, “Sometimes it helps me recognize traits I wasn’t consciously aware of. It is eye-opening” (C), suggesting that immersive technologies may serve as mirrors for introspection and personal awareness.

Beyond these traditional elements, a new subdimension, *growth*, emerged as a deeper extension of self-reflection. Participants described how immersive experiences helped them recognize personal weaknesses and discover new pathways for self-improvement and development. As one explained, “It helped me identify my weak points and realize where I need to grow” (A), while another noted, “Being able to view myself from a different perspective feels like personal growth” (B). This finding indicates that immersive technologies can function as catalysts for eudaimonic well-being, facilitating users’ ongoing process of self-understanding and personal evolution. Rather than merely offering entertainment or temporary satisfaction, immersive environments appear to encourage, constructive reflection, helping individuals reinterpret experiences, reassess goals, and envision self-betterment. Overall, the meaning in immersive

contexts is both reflective and developmental, encompassing affirmation, social connection, and inner transformation. By enabling users to perceive themselves within broader emotional and social narratives, immersive technologies extend the PERMA concept of meaning into a growth-oriented, self-expanding experience that blends introspection with psychological empowerment.

## Accomplishment

Within the Accomplishment dimension, participants reported experiences consistent with traditional PERMA subdimensions such as achievement and goal attainment. Many expressed that immersive and AI-supported technologies enhanced their sense of productivity and efficiency, allowing them to achieve desired outcomes with greater ease. One participant shared, “It clearly improved my productivity by handling parts of my work” (A), while another noted, “With its help, I could achieve certain goals more effectively” (C). These responses suggest that immersive technologies can serve as performance-enhancing tools that foster a sense of mastery and competence, which are the key psychological components of accomplishment in positive psychology. By streamlining complex tasks and providing immediate feedback, such technologies may strengthen users’ perceptions of self-efficacy and reinforce intrinsic motivation to achieve personal or professional objectives.

However, alongside these benefits, a distinct negative subdimension, *achievement-related anxiety*, as identified in this study, reveals the ambivalent emotional consequences of accomplishment in digital contexts. Some participants expressed concern that heavy reliance on immersive or AI-based systems could undermine self-growth or create psychological dependency. One participant reflected, “I realized I need to restrain myself and become someone who can grow without depending on this” (C), recognizing the potential trade-off between technological convenience and personal development. Another recounted, “When it suddenly stopped working, I panicked and felt anxious, like I couldn’t complete my task” (E), illustrating how dependence on automated systems can generate vulnerability and stress when technical disruptions occur.

These findings highlight the dual nature of accomplish-

Table 2. Original and Newly Identified PERMA Subdimensions from FGI Analysis of Immersive Technology

PERMA	Original items	New items
P scale	cheerful/joyful/energetic/delighted/proud/fearless/calm/happy/excited/active/daring/strong/lively	wonder/awe touched freedom Healing
E scale	absorbed/ interested/lose track of time/ forgot	
R scale	support/feeling loved/satisfied personal relationship	affective empathy emotional connection
M scale	encouragement/direction/purpose/self-reflection	growth
A scale	accomplishment/achievement/handle responsibilities	achievement-related anxiety

ment in immersive environments. While technology can enhance users' sense of achievement by improving efficiency and supporting goal pursuit, it can also provoke anxiety related to autonomy, competence, and control (Ryan & Deci, 2000). This tension suggests that accomplishment in immersive contexts is not purely positive but exists on a continuum between empowerment and dependence. Thus, immersive technologies simultaneously promote and complicate users' psychological experience of achievement, emphasizing the need to balance technological assistance with opportunities for self-directed growth and resilience.

In summary, the qualitative findings indicate that while the five core PERMA dimensions remain conceptually relevant within immersive technology contexts, new subdimensions such as wonder/awe, touched, escape, healing, affective empathy, emotional connection, growth, and achievement-related anxiety enrich the framework. New subdimensions—wonder/awe, touched, escape, and healing—indicate that immersive experiences evoke affective states richer and more layered than simple pleasure or satisfaction; specifically, wonder/awe reflects attentional expansion to perceived vastness or novelty, whereas healing reflects restorative calm and emotional recovery.

## Discussion and Implications

This study aimed to examine the applicability and potential

expansion of the PERMA framework (Seligman, 2011) within the context of immersive technology, using positive psychology as the guiding theoretical lens. Through qualitative analysis, the study identified how consumers experience and interpret well-being in immersive environments, revealing both traditional and newly emerging subdimensions of the PERMA model. Although the PERMA framework offers a comprehensive structure for understanding well-being, its original conceptualization was grounded in offline, human-to-human emotional and relational contexts. As a result, several affective and experiential states commonly elicited in immersive environments—such as wonder or awe, feelings of being emotionally touched, restorative healing, technologically mediated empathy, and emotional connection with non-human agents—fall outside the scope of PERMA's existing subdimensions. Traditional Positive Emotion primarily focuses on joy, positivity, and contentment; however, immersive systems frequently evoke attentional expansion and perceptual vastness (wonder/awe) or emotional recovery and soothing (healing), which are richer and more layered than general positive affect. Similarly, the Relationships dimension assumes interpersonal connection, while immersive technologies allow users to experience affective empathy, warmth, and resonance even with AI or virtual agents. These distinctions indicate that the original PERMA model does not fully capture the nuanced emotional and relational states arising in immersive contexts, thereby necessitating an expanded examination of potential

new subdimensions.

### Theoretical Implications

The findings of this study confirm that the five dimensions of PERMA remain central to understanding well-being but also reveal that they must be conceptually expanded to reflect the distinctive emotional and cognitive qualities of immersive technologies. Within Positive Emotion, new subdimensions such as *wonder/awe*, *touched*, *escape*, and *healing* emerged, showing that immersive experiences evoke richer and more layered affective states than simple pleasure or satisfaction. The sense of *awe* and *wonder* often arose from heightened sensory realism and novelty, while *emotional resonance* and *healing* appeared through empathetic exchanges in virtual and AI-mediated settings. These findings align with Gaggioli et al. (2017), who emphasized that emotional quality and social presence are key factors contributing to digital well-being.

In terms of Engagement and Relationships, the results illustrate both continuity and transformation within the PERMA framework. No new subdimensions were identified for Engagement, suggesting that the classical notion of *flow* or deep absorption (Csikszentmihalyi, 1990) continues to describe user involvement effectively in immersive settings. The findings thus reinforce the universality of engagement as a psychological construct that transcends media type or interface. However, within Relationships, two new subdimensions, *affective empathy* and *emotional connection*, were identified, reflecting an evolution in how individuals form social and emotional bonds through technology. Even AI-driven or virtual interactions were experienced as socially meaningful, demonstrating that social presence, reciprocity, and empathy have become essential components of users' relational well-being. This observation complements Hollebeek and Belk's (2021) argument that consumer-technology interactions increasingly mirror human-to-human relationships and therefore require consideration of emotional connectedness and psychological intimacy.

Finally, within Meaning and Accomplishment, immersive technologies appear to foster both empowerment and vulnerability. The emergence of *growth* as a subdimension of Meaning suggests that immersive systems can serve as tools

for self-reflection, insight, and personal development, helping users recognize strengths and weaknesses and discover new perspectives—echoing Seligman's view of meaning as an eudaimonic process of self-realization. Meanwhile, Accomplishment retained traditional aspects such as *achievement* and *goal progress* but also revealed a new negative dimension: achievement-related anxiety. Participants described feeling both supported and dependent on technology, benefiting from increased efficiency yet fearing loss of autonomy or competence when systems failed. This ambivalence mirrors themes in digital dependency research (e.g., Montag & Walla, 2016) and underscores the importance of designing immersive environments that balance technological empowerment with psychological self-efficacy. Collectively, these findings suggest that immersive technologies not only replicate but also reconfigure the ways in which PERMA dimensions manifest, pointing to the need for an expanded PERMA+ framework that incorporates *healing*, *empathy*, *emotional connection*, *growth*, and *achievement-related anxiety* to capture the complexity of well-being in immersive contexts.

### Practical Implications

From an applied perspective, this study provides actionable insights for developers, designers, and marketers in the immersive technology industry. First, recognizing awe, healing, and empathy as emotional outcomes can guide the creation of emotionally intelligent design that fosters well-being rather than overstimulation or detachment. For instance, incorporating narrative depth, empathetic AI responses, and personalized reflection tools may enhance user satisfaction and emotional resonance. Second, as growth emerged as a new source of meaning, developers should design systems that encourage users' self-discovery and development, such as reflective feedback features or progress visualization tools. This approach can strengthen user engagement while promoting eudaimonic well-being. Third, awareness of achievement-related anxiety calls for balanced system design. Over-automation may risk user dependency or anxiety when tools fail. Designers should consider mechanisms that promote user autonomy, such as adjustable assistance levels, goal-setting support, or transparent algorithmic

explanations. For marketers, highlighting immersive technology's potential for personal growth, creativity, and healing rather than mere entertainment can enhance consumer trust and position the technology as a facilitator of well-being. Similarly, organizations adopting immersive tools (e.g., metaverse platforms or AI systems) can leverage these insights to design employee training and digital wellness programs that promote sustainable technology use.

### Limitations and Future Directions

First, although a focus group interview (FGI) was conducted to obtain in-depth qualitative insights into consumers' perceptions of immersive technology, participant recruitment was constrained. It was particularly challenging to identify individuals who were both highly enthusiastic and habitual users of immersive technologies in their daily lives. As a result, the final sample included only five participants, whereas focus groups generally consist of six or more members to ensure diverse viewpoints and dynamic discussion. The small sample size may have limited the range of perspectives captured. This limitation reflects the emerging and specialized nature of immersive technology, as well as the varying degrees of accessibility and user familiarity across populations. As immersive technologies become increasingly integrated into daily life, future studies should recruit larger and more diverse samples to capture a broader range of experiences and enable more comprehensive qualitative and quantitative analyses.

Second, the study encompassed multiple forms of immersive technology—including augmented reality (AR), virtual reality (VR), metaverse platforms, and generative artificial intelligence (e.g., ChatGPT)—to explore PERMA-related experiences. However, participants' narratives primarily centered on ChatGPT, indicating that this technology currently elicits stronger engagement and accessibility compared to other immersive modalities. ChatGPT's conversational nature, responsiveness, and real-time interaction may have amplified participants' sense of immersion. Consequently, the findings are somewhat skewed toward AI-mediated experiences, limiting the comparative understanding of well-being across different immersive technologies. Future research should examine ChatGPT as an independent

domain, exploring its unique immersive qualities, user psychology, and long-term effects on well-being. Such studies could also compare ChatGPT-based experiences with AR, VR, or metaverse environments to identify shared and divergent mechanisms of psychological engagement.

Beyond these methodological considerations, future research should pursue quantitative validation of the new subdimensions identified in this study—such as *awe*, *healing*, *empathy*, *growth*, and *achievement-related anxiety*—through scale development and psychometric testing. A mixed-methods design could provide both depth and generalizability, while cross-cultural research would clarify how social and cultural contexts shape users' well-being in immersive settings. In addition, longitudinal studies could investigate how sustained interaction with immersive technologies influences PERMA-related outcomes over time, offering insight into both the benefits and potential psychological costs of continuous immersion.

Taken together, these directions highlight the need for ongoing interdisciplinary collaboration among scholars in psychology, human-computer interaction, and design studies. By expanding sample diversity, distinguishing between technological modalities, and validating new well-being constructs, future research can build upon this study's groundwork to advance a more nuanced and empirically supported understanding of positive psychology within immersive technology environments.

### Conclusion

This study provides initial qualitative evidence supporting the extension of the PERMA framework to the context of immersive technologies. By identifying new emotional and cognitive subdimensions, the findings reveal that immersive experiences can both enhance and complicate psychological well-being, emphasizing that well-being should be understood not as a static outcome but as a dynamic, technology-mediated process shaped by emotional, relational, and existential factors. The proposed conceptual foundation for an immersive technology-based PERMA scale offers a valuable starting point for future research, scale validation,

and interdisciplinary innovation, guiding the development of technologies designed to foster authentic human flourishing.

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