The Impact of Virtual Experience and Information Acquisition on Metaverse Expectations

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Date: 2023-08-26T00:00:00+00:00

Abstract

Abstract: [Purpose/Significance] China is currently still in the "pre-metaverse era." While the metaverse ontology, application scenarios, and transformative impacts have attracted scholarly attention, empirical research on metaverse user experience and user perception remains relatively weak. This study investigates whether relevant variables in the "pre-metaverse context" affect individuals' willingness to participate in the metaverse. Amid the accelerating proliferation of virtual devices and iteration of artificial intelligence, it seeks to understand people's current willingness to participate in the metaverse and their willingness to immerse themselves in the metaverse during daily activities, providing a reference for local governments to promote metaverse development. [Method/Process] This paper employs independent samples T-tests and one-way ANOVA to explore the correlation between virtual experience, information acquisition, and metaverse participation willingness. [Results/Conclusions] Analysis of 363 questionnaires reveals that VR/AR device experience and offline virtual interaction scene experience are correlated with individuals' metaverse participation willingness. Individuals with VR/AR device experience and offline virtual interaction scene experience demonstrate stronger metaverse participation willingness, with offline virtual interaction scene experience exerting a greater influence on metaverse participation willingness than VR/AR device experience. The frequency of acquiring metaverse-related information is positively correlated with metaverse participation willingness. In the process of metaverse promotion and publicity, attention should be paid to promoting multi-scenario, multi-functional offline virtual interaction scenes and strengthening the publicity efforts of traditional media.

Full Text

The Impact of Virtual Experience and Information Acquisition on Metaverse Participation Intention

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Abstract

[**Purpose/Significance**] China is currently in the "pre-metaverse era," where the metaverse ontology, application scenarios, and transformative impacts have attracted scholarly attention, yet empirical research on metaverse user experience and user perception remains relatively weak. This study investigates whether relevant variables in the "pre-metaverse context" influence participation intention in the metaverse. As virtual device 普及 and artificial intelligence iteration accelerate, understanding current public willingness to participate in the metaverse and to immerse themselves in metaverse environments during daily activities can provide valuable references for local governments seeking to promote metaverse development.

[**Method/Process**] This paper employs independent samples T-tests and one-way ANOVA to explore the relationships between virtual experience, information acquisition, and metaverse participation intention.

[**Results/Conclusions**] Analysis of 363 questionnaires reveals that VR/AR device experience and offline virtual interaction scene experience are correlated with individuals' metaverse participation intention. Individuals with VR/AR device experience or offline virtual interaction scene experience demonstrate stronger metaverse participation intention, with offline virtual interaction scene experience exerting a greater influence than VR/AR device experience. The frequency of metaverse information acquisition is positively correlated with metaverse participation intention. In the process of metaverse promotion and publicity, attention must be paid to promoting multi-scenario, multi-functional offline virtual interaction scenes while simultaneously strengthening traditional media publicity efforts.

Keywords: Metaverse, Virtual Experience, Information Acquisition, Participation Intention

With the progression of Web 3.0 and Industry 4.0, the metaverse has garnered significant attention in academia, with "Metaverse and New Narratives of Digital Existence" being selected as one of China's top ten academic hotspots in 2022. However, as a concept derived from literary science fiction, metaverse research remains in the stage of future prospects and preliminary attempts. Experts from different fields have yet to form a unified and clear understanding of the metaverse. Although the metaverse represents a major focus for industry

and society, many metaverse scenarios have not yet been implemented, relevant hardware remains unpopularized, and software has not become mainstream. Overall, China is currently in the "pre-metaverse era" [**?**].

At this stage, domestic metaverse research primarily focuses on conceptual interpretation and application prospects. In studies interpreting the metaverse concept, scholars are mainly divided into three schools: the parallel universe view, the integrated universe view, and the evolutionary universe view. Scholars holding the parallel universe view regard the metaverse as a simulation of the real world—a data projection of the natural reality universe constructed by humans through data language [**?**]—with replication of reality as its development path. Those holding the integrated universe view consider the metaverse a social form where virtual and real elements merge [**?**], with augmented reality as its development path. Scholars with the evolutionary universe view see the metaverse as a higher-order form of digital civilization based on digital technology, characterized by temporal-spatial extension, human-machine integration, and economic value-added [**?**], adhering to a development path that transcends reality. Research on metaverse application scenarios concentrates primarily on education [**?**], finance [**?**], libraries [**?**], culture and tourism [**?**], media [**?**], and other fields. Comprehensive analysis reveals that domestic metaverse research focuses mainly on the metaverse ontology and application scenarios, emphasizing its transformative impacts, while empirical research based on user experience and user perception remains relatively weak. Foreign scholars have already begun exploring user attitudes toward the metaverse.

This study aims to measure the relationship between virtual experience, information acquisition, and metaverse participation intention, investigating whether relevant variables in the "pre-metaverse context" influence participation intention. As the metaverse process may accelerate through virtual device popularization and artificial intelligence iteration, it is necessary to understand current public willingness to participate in the metaverse and to immerse in metaverse environments during daily activities, providing references for local governments to promote metaverse development.

2 Theoretical Foundation and Research Hypotheses

Research on metaverse participation intention has not yet attracted domestic scholarly attention, though foreign scholars have explored factors influencing public willingness to participate in the metaverse. Oleksy T's analysis of Polish public scene attachment and perceived threat in relation to metaverse migration intention found that, compared to real scenes, stronger attachment to virtual places predicts greater behavioral intention to migrate to the metaverse, while perceived threats such as personal safety issues and privacy violations negatively predict public migration intention [**?**]. Alvarez-Risco A's study of 410 Peruvian citizens examined the relationship between institutional support, technological literacy, self-efficacy, and metaverse participation intention, finding that institutional support and technological literacy positively influence self-efficacy for

metaverse participation through correlations of 0.573 and 0.257, respectively. Participation self-efficacy then positively influences metaverse participation intention with a correlation of 0.808 [**?**].

As China remains in the "pre-metaverse" stage, metaverse-related applications such as Meta and Roblox have not become popularized domestically, and large-scale, immersive cross-platform virtual worlds do not yet exist. However, metaverse-related experience projects, science popularization, and news reports have entered public view. Therefore, this study focuses on the impact of virtual experience and information acquisition on metaverse expectation, drawing from Problem-Solving Situation Theory and Flow Experience Theory to explore the mechanisms through which virtual experience and information acquisition influence public metaverse participation intention.

2.1.1 Problem-Solving Situation Theory

Problem-Solving Situation Theory is a new communication theory proposed by Kim [**?**], building upon Public Situation Theory. The theory primarily addresses how the public communicates to cope with problematic situations in life contexts. It comprises three dimensions: information acquisition, information selection, and information exchange. Antecedent variables influencing communication behavioral intention include problem recognition, involvement recognition, and constraint recognition as participation criteria, with situational motivation for problem-solving serving as a moderating variable for behavioral intention. The theory includes six dependent variables: information seeking, information attention, information filtering, information permission, information informing, and information sharing. This theory effectively explains the relationship between information processing and communication behavioral intention based on problem-solving contexts and can better predict public communication behavioral intention through relevant variables. Kim, the theory's proponent, believes Problem-Solving Situation Theory can be applied beyond public relations to other domains such as health information communication, political communication, food safety issues, and new technology diffusion.

2.1.2 Flow Experience Theory

Flow Experience Theory [**?**], proposed by Csikszentmihalyi, explains the phenomenon where individuals unconsciously enter a "self-forgetful" state during certain behaviors or experiences, thereby ignoring irrelevant information and surroundings. In this state, individuals develop motivation based on the activity itself, influencing their continuous usage intention and experience perception, with this motivation exerting a stronger and more enduring effect on behavioral intention than external factors. As Flow Experience Theory has developed and matured, additional factors influencing flow experience have been proposed. In Csikszentmihalyi's original model, flow experience occurs when external challenges perceived by the subject coordinate with their abilities. Csikszentmihalyi later developed this further, noting that individual flow experience also changes

with external environmental variations. Jackson et al. [**?**] argue that four more nuanced individual states—arousal, relaxation, control, and worry—affect individual experience and subsequently influence behavioral intention.

Since the 21st century, with the rapid development of mobile internet and widespread application of emerging technologies, Flow Experience Theory has been extended to new internet experience domains such as online shopping experience [**?**], online gaming, and instant messaging. As the metaverse, which emphasizes immersion and experience, gradually popularizes, Flow Experience Theory's explanatory scope will further expand, enabling research on public psychological states and behavioral intentions regarding metaverse participation.

2.2.1 Virtual Experience and Participation Intention

Flow Experience Theory research has found that experience can change user attitudes and behavioral intentions. Experience quality is a direct driver of online consumer behavior intention [**?**], with consumers' online shopping experiences enhancing purchase intention. In research on viewing intention, audience viewing experience positively influences viewer behavioral intention, with sensory experience, emotional experience, cognitive experience, and action experience all positively affecting viewer behavioral intention [**?**]. Tourism intention research has found that tourism experience partially positively influences happiness, satisfaction, and behavioral intention, with happiness positively influencing satisfaction and behavioral intention, and satisfaction positively influencing behavioral intention [**?**]. The metaverse has the potential to extend the physical world through virtual-real interaction technology and virtual reality technology, allowing users to seamlessly interact in real and simulated environments using digital avatars. Experience plays a crucial role in helping users understand metaverse scenarios and enhancing metaverse participation intention.

Therefore, this study posits that virtual experience promotes metaverse participation intention and proposes the following hypotheses:

H1: VR/AR device experience is correlated with metaverse participation intention.

H2: Offline virtual interaction scene experience is correlated with metaverse participation intention.

2.2.2 Information Acquisition and Participation Intention

Social media information acquisition is an important factor influencing individual behavioral intention. When individuals face public health emergencies, their information acquisition through social media can predict behavioral intentions aligned with collectivist values, where individual involvement recognition and constraint recognition can predict situational motivation, and both situational motivation and reference standards can predict each dimension of information acquisition—information seeking and information attention [**?**]. In communica-

tion behavior research based on Problem-Solving Situation Theory, three situational variables of information acquisition—problem recognition, constraint recognition, and involvement recognition—significantly and positively influence individual behavioral intention [**?**]. Compared to public health emergencies and media communication, metaverse-related information acquisition involves lower risk, primarily manifesting as online understanding of relevant concepts, policies, and development prospects. In the metaverse's current stage, the influence of information acquisition frequency is more important than perceived risk.

Therefore, this study posits that information acquisition promotes metaverse participation intention and proposes the following hypothesis:

H3: Information acquisition is positively correlated with metaverse participation intention.

3.1 Data Collection

This study employed an online questionnaire survey for data collection. Collected questionnaires on metaverse participation intention were screened based on response time, IP address, and whether respondents selected the same option consecutively, retaining 363 valid questionnaires. The demographic characteristics of respondents are shown in Table 1 .

Table 1 Sample Demographic Characteristics

The data analysis of 363 valid sample users reveals a balanced gender ratio, with males accounting for 52.617% and females for 47.383%. In terms of age distribution, the largest group is aged 19-25 years (50.689%), followed by those aged 26-32 years. Regarding education level, over 90% of respondents hold a college diploma or bachelor's degree or higher.

3.2 Variables and Measurement

The questionnaire comprises three main sections: (1) basic respondent information including gender, age, and education level; (2) current status of respondents' virtual experience and information acquisition; and (3) respondents' metaverse participation intention. Variables and measurement methods are detailed in Table 2 .

Table 2 Main Questionnaire Contents

The questionnaire includes items measuring information acquisition frequency (1=never, 2=occasionally, 3=neutral, 4=frequently, 5=very frequently) and information acquisition channels (multiple choice: WeChat official accounts, short video platforms like Douyin and Kuaishou, metaverse-themed forums and conferences, metaverse-related books, no acquisition channels, etc.), as well as participation intention items such as "I would recommend people around me to participate in metaverse-related activities."

4.1 Analysis of Virtual Experience and Participation Intention Relationship

To explore the relationship between virtual experience and metaverse participation intention, this study conducted independent samples T-tests. First, normality testing was performed on the metaverse participation intention data. With a sample size of 363 (less than 5000, constituting small sample data), the Shapiro-Wilk test was selected, as shown in Table 3 .

Table 3 Normality Test Results

The Shapiro-Wilk test yielded a significance P-value of 0.000***, indicating statistical significance. The kurtosis absolute value (-0.478) was less than 10, and the skewness absolute value (-0.379) was less than 3. Combined with the normality distribution histogram (Figure 1 [Figure 1: see original paper]), which shows a basically high-middle pattern, the data, while not absolutely normal, is acceptable as approximately normally distributed.

Figure 1 Metaverse Participation Intention Normality Test Histogram

Following normality testing, homogeneity of variance testing was conducted, with results shown in Table 4 . For metaverse participation intention, the homogeneity of variance test yielded a significance P-value of 0.923 (>0.05), indicating no statistical significance and failure to reject the null hypothesis, thus confirming that the data meets the homogeneity of variance assumption.

Table 4 Homogeneity of Variance Test

After confirming normality and homogeneity of variance, independent samples T-tests were conducted on VR/AR device experience and metaverse participation intention. As shown in Table 5 , the mean metaverse participation intention scores for those with and without VR/AR device experience were 5.261 and 4.31, respectively. The significance P-value was 0.000*** (<0.05), indicating statistically significant results and confirming a significant difference in metaverse participation intention between those with and without VR/AR device experience. The Cohen's d value was 0.579, indicating a medium effect size (with 0.20, 0.50, and 0.80 representing small, medium, and large thresholds, respectively). Individuals with VR/AR device experience showed medium-level differences in metaverse participation intention compared to those without such experience, with higher mean participation intention among experienced individuals.

Therefore, hypothesis H1 (VR/AR device experience is correlated with metaverse participation intention) is supported.

Table 5 Independent Samples T-Test Results

For the analysis of offline virtual interaction scene experience, homogeneity of variance testing (Table 6) yielded a significance P-value of 0.127 (>0.05), confirming that the data meets the homogeneity of variance assumption.

Table 6 Homogeneity of Variance Test

Independent samples T-tests for offline virtual interaction scene experience and metaverse participation intention (Table 7) showed mean scores of 5.4 and 4.303 for those with and without such experience, respectively. The significance P-value was 0.000*** (<0.05), indicating statistically significant results and confirming a significant difference between groups. The Cohen's d value was 0.677, indicating a medium effect size. Individuals with offline virtual interaction scene experience showed medium-level differences in metaverse participation intention compared to those without such experience, with higher mean participation intention among experienced individuals.

Therefore, hypothesis H2 (offline virtual interaction scene experience is correlated with metaverse participation intention) is supported.

Table 7 Independent Samples T-Test Results

4.2 Analysis of Information Acquisition and Participation Intention Relationship

This study employed one-way ANOVA to test whether individuals with different information acquisition frequencies exhibit significant differences in metaverse participation intention, thereby exploring the relationship between information acquisition and participation intention. Based on previous analysis confirming approximate normal distribution of metaverse participation intention, ANOVA was conducted on information acquisition frequency and metaverse participation intention (Table 8). Mean participation intention scores for information acquisition frequencies of "never," "occasionally," "neutral," "frequently," and "very frequently" were 4.008, 4.900, 4.829, 5.648, and 6.500, respectively. The ANOVA result P-value was 0.000*** ($ $0.05), indicating statistically significant results and rejection of the null hypothesis, confirming significant differences between groups.

Table 8 ANOVA Results for Information Acquisition Frequency and Metaverse Participation Intention

Following significant differences, effect size was calculated (Table 9). The partial eta squared (^{2}) value for metaverse participation intention was 0.168, indicating that 16.8% of the variance is attributable to differences between information acquisition frequency groups. The Cohen's f value was 0.449, with small, medium, and large effect size thresholds being 0.1, 0.25, and 0.40, respectively, indicating a large effect size.

Table 9 Effect Size Analysis

In summary, individuals with different information acquisition frequencies exhibit significant differences in metaverse participation intention. Mean participation intention scores increase with information acquisition frequency (4.008, 4.9, 4.829, 5.648, 6.5), demonstrating a positive correlation between information acquisition frequency and metaverse participation intention.

Therefore, hypothesis H3 (information acquisition is positively correlated with metaverse participation intention) is supported.

5.1 Discussion of Virtual Experience Analysis Results

Independent samples T-tests exploring the relationship between virtual experience and metaverse participation intention revealed that both VR/AR device experience and offline virtual interaction scene experience are correlated with metaverse participation intention. Regarding VR/AR device experience, individuals with such experience showed a mean participation intention of 5.261, significantly higher than the 4.31 mean among those without experience. For offline virtual interaction scene experience, experienced individuals showed a mean participation intention of 5.4, significantly higher than the 4.303 mean among inexperienced individuals. Comparing the effect sizes, the Cohen's d value for VR/AR device experience was 0.579, while for offline virtual interaction scene experience it was 0.677, indicating that offline virtual interaction scene experience exerts a greater influence on metaverse participation intention. Therefore, governments should prioritize promoting multi-scenario, multi-functional offline virtual interaction scenes in metaverse publicity efforts. Current metaverse virtual interaction scene experiences have seen preliminary development in libraries [**?**], culture and tourism [**?**], and finance [**?**], but the sense of immersion requires further enhancement. Governments should encourage relevant enterprises to explore virtual interaction experiences across more scenarios.

5.2 Discussion of Information Acquisition Analysis Results

One-way ANOVA testing revealed a positive correlation between information acquisition frequency and metaverse participation intention. Multiple response analysis of individuals' metaverse information acquisition channels (Table 10) showed that the chi-square goodness-of-fit test was significant (P=0.000***), indicating significant differences in selection proportions across channels, with uneven distribution.

Table 10 Multiple Response Frequency Analysis

Analysis of response rates and penetration rates reveals that the primary channel for public metaverse information acquisition is WeChat official accounts (60% penetration rate), followed by short video platforms, friend communication, and news reports as important channels.

Further analysis of public information acquisition channels (Table 11) shows that the chi-square test was significant (P=0.000***), indicating that different metaverse participation intention levels exhibit significant differences in channel selection (WeChat official accounts, short video platforms, metaverse-themed forums and conferences, metaverse-related books, friend communication, no acquisition channels, news reports). Comprehensive multiple response analysis indicates that not only do selection proportions differ significantly across chan-

nels, but different metaverse participation intention levels also show significant differences in channel preferences.

Table 11 Multiple Response Cross-Analysis

Comparing information acquisition channel differences among individuals with varying metaverse participation intentions (Figure 2 [Figure 2: see original paper]) reveals that individuals with high participation intention rely more heavily on news reports and metaverse-themed forums and conferences for information acquisition. Therefore, traditional media publicity should not be overlooked in metaverse promotion. First, publicity efforts for metaverse-related news reports should be strengthened. The "Good Morning Metaverse" program, launched by SMG's Integrated Media Center and broadcast on multiple platforms including Dragon TV and STV News Channel, features a virtual news anchor "Shen Suya" who delivers and explains the latest metaverse news in accessible language, producing authoritative, professional, and cutting-edge metaverse content and establishing a solid public foundation for metaverse popularization. Second, high-quality metaverse-themed forums and conferences should be organized and publicized. Events such as the Shanghai Metaverse New Year Forum, the "Metaverse and Smart Libraries" High-Level Academic Forum, the Global Home Internet Conference Metaverse Summit, and the "Paradise Made Concrete: The Ideal of Library Metaverse" Forum have been successfully held and attracted significant attention, making substantial contributions to public metaverse enlightenment. In the future, universities and relevant enterprises should leverage their professional and technological advantages to organize more diverse and innovative themed forums, enriching public access to metaverse information.

Figure 2 Cross-Analysis of Information Acquisition Channels and Participation Intention

6 Summary and Outlook

This survey of public willingness to participate in the metaverse yields the following conclusions: (1) Individuals with VR/AR device experience and offline virtual interaction scene experience demonstrate higher metaverse participation intention. While governments support sustainable metaverse industry development, they should also focus on VR/AR and virtual interaction industries, enhancing public metaverse participation intention through device and scene popularization. (2) Higher information acquisition frequency correlates with higher metaverse participation intention. As local governments actively promote metaverse industry development and implement metaverse development plans, simultaneous publicity efforts are essential, providing authoritative and cutting-edge metaverse information to enrich public cognition and enhance participation intention. (3) WeChat official accounts, short video platforms, news reports, and friend communication are important channels for public metaverse information acquisition. Beyond social media and short video platforms, traditional media publicity should not be neglected. Strengthening metaverse-related

news reporting and creating innovative, content-rich metaverse information programs will become important approaches to metaverse promotion.

This study has several limitations. First, sample selection is limited. The study collected 363 questionnaires, with over 50% from respondents aged 19-25 and only 2.204% aged over 60. As the metaverse will benefit all of society in the future, not just younger generations, older adults' participation intention also requires attention. Second, in examining virtual experience's impact on metaverse participation intention, this study only explored whether virtual experience experience influences participation intention. Future research should further investigate how factors such as external challenges and self-ability during virtual experience processes affect metaverse participation intention.

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Note: Figure translations are in progress. See original paper for figures.