Innovation Diffusion and Use Satisfaction: A Study of the cognitive schema from the Metaverse Concept

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Abstract: This study analyzes the reasons for users' ambiguous perceptions of the Metaverse from the perspective of the cognitive base model, based on the public's understanding of the concept of Metaverse, and the intrapersonal communication direction from the audience's perspective. This study analyses the relationship between audience satisfaction and the cognitive schema of Metaverse, and initially explores the relationship between the audience's own cognitive level and the cognition of Metaverse, as well as the influence of audience access channels on the degree of metaverse cognition. We found that when the Metaverse can satisfy certain needs of the audience, it can make the audience further understand the new concept of Metaverse; At the same time, the future development direction of the Metaverse should be closer to the needs of the audience's life.

Keywords: Cognitive schemes,;Metaverse; Use and satisfaction; Innovation and diffusion

1 Introduction

In recent years, with the continuous development of mobile internet and artificial intelligence technology, many virtual concepts are increasingly becoming realistic content. Virtual reality technology, as a cutting-edge technology, has received considerable attention from various countries for its research and development. In

early 2020, the outbreak of a new coronavirus and the quarantine of the epidemic have forced people to work from home and to rely on the internet for communication and information, as if they were in a virtual life constructed by numbers. This has led to the concept of Metaverse, which can support people in their virtual social life, accelerating into the public domain. Since 2021, Metaverse-related derivatives such as virtual anchors, online virtual businesses, virtual reality teaching, VR online exhibitions and various digital collectibles (nft) have emerged and exploded, making the concept of Metaverse more widely known.

However, most audiences only know about the Metaverse at a superficial level and have little understanding of its deeper concepts, or even the word "Metaverse", which is in contrast to the rapid familiarity and acceptance of media such as Jitterbug when it first emerged.[1] This is in stark contrast to the rapid familiarity and acceptance of media such as Jitterbug when it first emerged.

As a new medium created by technologies such as "5G", "Blockchain" and "big data" in the context of the new media era, why have platforms such as Jitterbug entered the public's life so quickly, while the Metaverse remains a visible but unreachable star? Why is the Metaverse still a visible but inaccessible star while ShakeYin and other platforms are rapidly entering the lives of the masses? In this regard, we ask why the Metaverse cannot be perceived and accepted as quickly as other media such as Jitterbug. Therefore, based on a survey of the public's understanding of the concept of Metaverse, this study analyses the reasons for users' ambiguous perception of Metaverse from the perspective of the audience and the direction of intrapersonal communication.

2 Overview

2.1 A literature review of Metaverse technology

The year 2021 is the year of the "Metaverse", which has received a lot of attention as an Internet industry concept. Specifically, the term Metaverse comes from the description of the famous American science fiction master Neal Stephenson in his novel Snow Crash. In his novel, he created a virtual world where people "wear headsets and goggles and can enter a computer-simulated virtual space parallel to the real world as a virtual avatar".[2]The Metaverse is also known today as the Omniverse. Today, the

Metaverse, also known as the Internet of Totality and the Internet of Shared Virtual Reality, is a super-digital scenario that transcends real and virtual space, creating a new conceptual society in which real space and virtual scenarios are intertwined and physical and virtual identities merge in this day and age.[3] The Internet of Virtual Reality is a super digital scenario that transcends real space and virtual space.

In recent years, more and more Internet companies have incorporated the concept of Metaverse into their corporate future. The social media giant Facebook has announced that it will change its name to Meta and that it will transform itself into a Metaverse company within five years. [4]It is evident that many Internet and media platform companies have caught on to the prospect of a Metaverse and are actively involved in building a model of the future Metaverse. In addition, the increasingly hot NFT trading, TV shows based on Metaverse, and Metaverse exhibitions are among the many related new things built on top of Metaverse, giving more and more people the opportunity to access and experience the virtual world represented by Metaverse. Despite the wild imagination of netizens and even the construction of Metaverse models, Metaverse still faces the problem of unclear definition and blurred boundaries in the popular perception.

The professor Yu Guoming analyses the logic of future media evolution from the "scene era" to the "Metaverse" to the "mind world" and its dimensional breakthrough for the freedom of human social practice.[5] The logic of the future media evolution from the "scene era" to the "Metaverse" to the "mind world" and its dimensional breakthrough for the freedom of human social practice. From the perspective of economics, Zheng Lei explores the impact and relationship between the virtual digital economy of the Metaverse and the real economy, and how it can contribute to economic development and broaden the horizon of economics.[6] Liu Geping, on the other hand, takes an educational perspective. From the perspective of education, He also discusses the impact of Metaverse technology on the future of education. Karl Patta starts from the perspective of the metaverse and human health, and explores the role of the metaverse in promoting human medicine in the future [7] Gulsoy Dogan et al. took the presence and virtual reality experience as the cut-in to study the impact of the metaverse on the future development of hotel tourism.[8]As a result, most scholars have focused on the virtual reality technology of Metaverse, exploring the macroscopic impact of Metaverse on the future development of society, while lacking research on the psychological aspects of the audience. At the same time, most scholars have

focused on the economic aspects of Metaverse as a new investment trend, exploring what economic benefits Metaverse can bring, while ignoring the connection between the audience as consumers and the Metaverse technology itself. Other scholars have looked at the role of Metaverse technology in the future of education and social and cultural construction from the perspective of political and cultural education, while lacking a conceptual framework of Metaverse from the intrapersonal communication of the audience itself.

2.2 An overview of the development of cognitive schema theory

The cognitive schema theory, which refers to "the basic patterns of human cognitive behaviour, or the structure of the mind, cognitive structures or cognitive guidance structures.".[9]It was first proposed in 1781 by the classical German philosopher Immanuel Kant in his book "Critique of Pure Reasoning"[10] In the 1960s, following the Swiss educationalist Piaget's research on child growth and cognitive development, it began to be noticed by scholars and was widely used in the study of education, information processing and communication. It can be described as a compromise between the new information and the old model, resulting in attitudes and reactions to the new.

Specifically, birthright is one of the characteristics of the schema. It's not just a pattern of behavior that we're born with, it's also a classification system, layered, like a tree. It assembles our knowledge and forms an organic union between them as a model for our cognition of things. When we are faced with something new, with new information, we process it using the experience and knowledge we already have in our brains. Cognitive primitives help us to understand new things quickly, to interpret them, and to improve our rate of initial understanding of emerging things. However, cognitive primitives are also flawed in their processing of new information, as our old experiences and knowledge cannot be fully adapted to the new information, resulting in incomplete perceptions and biases.

With the in-depth study of social audiences in communication, from the initial transmitter-centred approach to the recipient-centred approach, it is necessary to take into account the needs of the audience in order to achieve better communication results. In order to attract more audiences and improve the effectiveness of communication, various media are constantly moving their media frames closer to the audience frame.

[11]Audience frames refer to the cognitive structures and rules of interpretation by which individual audiences encounter and process mass communication messages, in fact they refer to the cognitive schema. [12] It is, in fact, the cognitive matrix.

The new communication revolution has shaped the structure of today's new media age, where we are inundated with information on a daily basis. Compared to the past, when we learned from our own experiences and knowledge and the teachings of our elders, today's cognitive matrix is more dependent on the ubiquity of the media and the vast amount of information available. With technologies such as '5G', 'Block chain' and 'Big data', the ways and channels of cognition and the new things that audiences are aware of are becoming more and more diverse. In the new media era, it is particularly important to build the right matrix structure for audiences, to enable them to quickly identify false information and to improve their matrix with correct and high-quality information. This is why it is so important to structure audiences correctly, to enable them to quickly identify false information, and to improve them through correct and high-quality information.

Through a review of existing research, it can be found that there is a lack of research on Metaverse from the perspective of audience psychology. Based on this, this paper will analyse the concept of cognitive schema s of audience psychology in the context of communication in the new media era, in order to complement and improve the research in this field.

3 Study design

3.1 Research questions

Through a reviewing the existing studies, it can be found that there is a lack of research on Metaverse from the perspective of audience psychology. Based on this, this paper will analyse the concept of cognitive schema of audience psychology and Metaverse in the context of communication in the new media era, in order to complement and improve the research in the Metaverse field.

The objects of this paper is young people aged 15-35 years old, and it focuses on the following two aspects: firstly, what are the factors that influence the construction of the audience's schema of the Metaverse ? Second, is the public's schema of the Metaverse one-sided? If so, what are the reasons?

3.2 Research hypothesis

Based on the research questions above, the corresponding hypotheses are presented here.

H1: The more the Metaverse meets the needs of the audience, the better the cognitive schema

H2: The higher the audience's own cognitive level and the more relevant knowledge they have accumulated, the better their knowledge about the Metaverse

H3: Different cognitive channels of audiences' access to Metaverse information and the time of exposure to them will lead to different degrees of Metaverse cognition

3.3 Research Methodology

This study chooses the interview method to measure the dimensions used by the Metaverse cognitive schema: the degree of satisfaction of needs, the degree of knowledge, and the channels for receiving information. The measurement of the intensity of social media use draws on the coding design of in-depth interviews in the study "Media Perception Investigation of Appearance Anxiety in Youth and Its Realistic Influence". The design includes four cognitive schema information processing processes, namely "1.Original cognitive schema", "2.Receiving new information", "3. Integration of original schema and new information", "4. Participate in the processing of personal information".

The author made adjustments on the basis of this scale to form the coding design of the Metaverse interview in this study, which includes 5 information processing processes and 13 coding indicators. The design is as follows.

Table 1: Interview outline variable design

Variables	Dimensionality reduction	Description of the problem
Cognitive Schema	Self-Knowledge of the Metaverse	What do you think is relevant to the concept of Metaverse?
	Society's study of the Metaverse	
Receiving information	Access to the Metaverse	What platform do you usually choose to receive information?
	Ways of receiving new knowledge	How do you usually learn about the Metaverse?
	Time to receive knowledge of the Metaverse	What is the typical length of exposure to the knowledge of the Metaverse?
Demand Satisfaction	Purpose of Using the Medium	What is the usual medium used for?
	The need to use the medium	What do you want the medium to meet your needs?
	Demand for the Metaverse	What would you like to see Metaverse do for you?
Cognitive level	For the knowledge base	What Metaverse-related knowledge have you been exposed to before? e.g. 5G, Blockchain, virtual reality technology, etc.
	Self-education	What are your qualifications?
	Engaged in work	What is your occupation?
Other relevant factors	Media access rights	Prices of Vr and other related equipment
	Teaching related knowledge	Analysis of Metaverse-related courses

In comparison, the research of the original cognitive schema has been reduced to add the measurement of needs and satisfaction content, which is more in line with the properties of the emerging concept of Metaverse itself.

4 Sample Results and Analysis

4.1 Data cleaning

The interviewees were set to a select group of young people aged 15 to 35. The author used online communication to conduct the interviews and collected 101 samples (97 valid samples) with an effective rate of 96.04%. The reliability of the research data

from the interviews, Cronbach α = .808, exceeded the theoretical requirement value of .70, which collectively indicates high quality of data reliability.

4.2 Hypothesis testing

According to the interview set-up, two sample performances, "audience needs" and "awareness", were set for analysis, as shown in Table 2.

Table 2 Depth of perception of the concept of Metaverse compared to audience needs

Cognitive level	Unaware of the Metaverse	I've heard of it but don't really know what it is	Have some understanding	In-depth knowledge of its nature and principles
	Have some understanding			
	In-depth knowledge of its nature and principles			
Number of cognitive samples	13	45	36	3
Number of samples with relevant needs	1	6	20	2
Proportion	0.07	0.13	0.56	0.67

The data in Table 2 show that the sample is expressed as a state of audience demand and understanding of the concept of the Metaverse. By looking at the level of understanding of the Metaverse in terms of "have a good understanding of its nature and principles" and "have a certain level of knowledge" and the proportion of "have actively sought out relevant content", the results show that (Table 2), assuming that the sample has a good understanding of the Metaverse concept, the results show that the sample has a good understanding of the Metaverse. By correlating the level of understanding of the Metaverse concept with the needs of the audience, the results show that (see Table 2) hypothesis 1: the more the Metaverse meets the needs of the audience, the better the cognitive model is.

According to the interview set-up, two samples of performance, "level of education" and "level of conceptual understanding", were set for analysis, as shown in Table 3.

Table 3 Depth of perception of the concept of Metaverse compared to level of education

Academic level	Lower secondary and below	High School	University & College	Postgraduate students
Sample size	4	15	75	3
Sample size with a certain level of awareness and above	0	4	32	2
Proportion	0	0.27	0.42	0.67

The data in Table 3 shows that the samples are in the state of "education level" and "understanding of the concept of the Metaverse". According to the proportion of the samples at each educational level who have "a relatively in-depth understanding of its properties and principles" and "a certain degree of cognition" about the understanding level of the Metaverse, the difference between "educational level" and "understanding of the concept of the Metaverse" The results show (see Table 3) that the sample's "educational level" has an impact on its "cognition of the Metaverse". Hypothesis 2: The higher the audience's own cognition level, the richer the accumulation of relevant knowledge, and the more perfect their cognition of the Metaverse, is established.

Based on the interview set-up, two sample performances, "information reception channel" and "level of conceptual understanding", were set for analysis, as shown in Table 4.

Table 4 Comparison of the depth of perception of the concept of Metaverse and the channels of information reception

Information reception channels	Short video platforms	Little Red Book	Microblogging	Circle of friends or public	News Software	Other
Sample size	17	7	46	16	5	6
Sample size with a certain level of awareness and above	6	3	17	9	2	2
Proportion	0.35	0.43	0.37	0.56	0.4	0.33

The data in Table 4 show that the samples are expressed as "information receiving channels" and "states of the degree of understanding of the concept of the Metaverse". Through the analysis of the proportion of samples with "a relatively in-depth understanding of its properties and principles" and "a certain degree of cognition" in the understanding level of the Metaverse in different information receiving channels, the results show (see Table 4) that different information The proportion of receiving channels with a certain degree of awareness of the Metaverse and above is similar, indicating that the cognitive channels have less influence on the degree of awareness of the Metaverse. Hypothesis 3: Different cognitive channels for audiences to obtain Metaverse information and different time of contact channels will lead to different degrees of Metaverse cognition, which is not true.

In general, there is a common imperfection in people's perception of the Metaverse. According to the survey, the degree of Metaverse cognitive schema construction is correlated with the degree to which the Metaverse meets the needs of the audience and the level of individual knowledge. Users are more willing to learn about the Metaverse when they have needs for social interaction, entertainment, knowledge, information and when the Metaverse satisfies their needs to a high degree, and their Metaverse cognitive schema is more perfect. The more knowledge they have, the more educated they are, or the more they work in the media or the Internet, the more they know about the Metaverse and the better their Metaverse cognitive schema are. However, different media exposure channels have less influence on the construction of Metaverse cognitive schema.

5 Conclusions and Recommendations

5.1 Needs satisfaction facilitates audience exposure to and refinement of the cognitive matrix of the metaverse

According to Rogers' theory of innovation and diffusion, there are at least four stages from the emergence of something to its widespread use: awareness, persuasion, decision and confirmation. In the context of the new media era, the amount of information available to audiences has increased dramatically, and access to it has become increasingly convenient,.So every audience has the opportunity to fully access relevant information. It can be seen that the audience's acceptance of the metaverse

depends mainly on the persuasion stage and whether the audience is satisfied with its evaluation or not.

Audiences are seen as individuals with specific needs and their media exposure is seen as a process of using the media based on specific needs motivating them to have those needs . The process of satisfying these needs. Based on the use and satisfaction theory, when the metaverse satisfies certain needs, the audience revises their impressions of the metaverse, thus enabling the metaverse to create a favourable attitude in the persuasion phase and stimulate further interest in understanding it. In this way, the audience can receive new knowledge about the metaverse and develop and refine their original base models, which in turn can be used to understand the new concept of the metaverse.

6.2 Meta-universe publicity should be more relevant to users' lives

Through the above analysis, if the Metaverse is to be accepted and used by the public, its future development should be closer to the audience's life, towards meeting their needs for information, self-construction, interpersonal communication and entertainment. In a questionnaire survey on the audience's needs for Metaverse, more than half of the respondents said that they were more concerned about and expected Metaverse to meet their social experience in a different way. Particularly in the context of the epidemic, audiences who have spent long hours in seclusion are eager for face-to-face human interaction. The sense of presence that Metaverse can provide is a feature that makes it superior to other media. Therefore, this advantage should be amplified accordingly when promoting the Metaverse.

In addition to this, the Metaverse, as a super-frontier concept, is inherently complex. Therefore, in the process of cognitive schema building, the original base model is more complete, and the audience with more accumulated knowledge and higher education is more able to form a perfect base model. The propaganda should take into account the attributes of different users and, through big data algorithms and other technologies, introduce the deeper meta-universe concepts to younger users with higher education levels, while recommending more simple and easy-to-understand content to users with lower education levels and who are older or younger. This creates a majority sentiment in favour of the Metaverse at the persuasion stage, allowing it to be generally accepted by the audience at the subsequent decision and confirmation stages.

However, there are still many shortcomings in this study. In the survey of the respondents, we found that metacosmic access also has some influence on the audience's cognitive schema , but we only asked simple questions about this factor and did not conduct in-depth investigation, research and careful discussion. The research on the influence of metacosmic media access and metacosmic courses on audience building of metacosmic cognitive models may be one of the directions for future research.

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