

# Research on Transmission and Expression Design of Online Game Design Elements Based on Wireless Communication Technology

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## ABSTRACT

The collection and transmission of data play an extremely important role in both daily life and industry. However, traditional wired data transmission is far from meeting the requirements, and installation and wiring are difficult. At the same time, it requires a lot of manpower and material resources for management, and there are a series of problems such as line ageing. Therefore, wireless data collection and transmission has become a reasonable alternative. Wireless communication technology is an important medium for the development of online games, and its gradual expansion has given it a unique voice in the online game market. The study first clarified that online games and wireless communication technology are two different concepts, and the two are constantly integrating into their development; Secondly, taking the online game Genshin Impact as the case, starting with the image construction of virtual existence, expression construction of emotional communication and participatory behavior construction, it is found that the integration of online games and wireless communication technology is deepening; This paper takes the online game "Genshin Impact" as a case to study the integration of online game design elements transmission and expression and wireless communication technology. Through investigation and analysis of fan groups, the characteristics of online game fan groups and their impact on the game were revealed. At the same time, combined with the development of wireless communication technology, this paper explores how to use wireless communication technology to enhance the gaming experience, and improve user stickiness and loyalty.

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## INTRODUCTION

Online games have become an important component of modern youth culture, and the existence of fan groups is of great significance for game developers and researchers. In this context, this paper takes the popular online game "Genshin Impact" as a case to study the integration of online game design elements and wireless communication technology. Firstly, we will review the development process of online games and explore their impact and appeal among young people. Subsequently, we will focus on the composition and characteristics of online game design elements, and analyze the impact and role of wireless communication technology on the gaming industry. By gaining a deeper understanding of

the behavior and preferences of the fan community, we can better understand their needs and expectations for the game. In addition, this article will also focus on the development and application of wireless communication technology. We will study the application scenarios of wireless communication technologies in anime games, and explore how to use these technologies to enhance the game experience. The continuous advancement of wireless communication technology provides game developers with innovative opportunities, such as strengthening connections between players through real-time interaction and social functions. Finally, we will take Genshin Impact as a case to elaborate on the application of wireless communication technology in the game. By analyzing the effectiveness of application implementation

and user feedback, we can evaluate the impact of wireless communication technology integration on game user stickiness and loyalty, and propose suggestions for improvement and development .<sup>[1]</sup>

## INTRODUCTION TO SEVERAL WIRELESS COMMUNICATION TECHNOLOGIES

In recent years, with the rapid development of wireless communication technology, more and more wireless technologies have been applied in our lives. In this section, we will focus on introducing several popular wireless communication technologies, namely Near Field Communication (NFC), Bluetooth, Wi-Fi, Zigbee, and the 433MHz wireless technology used in this article. By introducing and comparing these technologies, we can understand their corresponding characteristics and applicable fields.

### Near Field Communication NFC

NFC (Near Field Communication), also known as Near Field Communication in Chinese, is a standard based short-range wireless connection technology that enables simple and secure two-way data exchange communication between multiple electronic devices. Currently, this technology is mainly applied to short-range communication between electronic devices. Its main technical features include the following aspects:

The operating frequency is 13.56MHz, which is developed based on the high-frequency Radio Frequency Identification (RFID) technology of 13.56MHz. RFID technology also has low and ultra-high operating frequencies.

The working distance generally does not exceed 10 centimeters, and the theoretical communication distance is 0-20 centimeters. However, in practical product applications, special power suppression technology is used to ensure the safety of the product and business, so that the working distance is within 10 centimeters.

The transmission rates include 106kb/s, 212kb/s, and 424kb/s.

The communication mode is divided into active mode and passive mode: active mode refers to the fact that both the initiating device and the target device can generate an RF field to work through their own power supply; The difference between passive mode and active mode is that the target device does not require its own power supply. During operation, the initiating device relies on its own power supply to generate an RF field. The target device, on the other hand, uses its own full wave rectification circuit when approaching

the initiating device to convert the radio frequency energy emitted by the initiating device into electrical energy for its operation. In addition, it also has many characteristics, such as supporting three different application modes: card mode; Read and write mode; NFC point-to-point mode. The fields of NFC applications also include multiple categories, such as access control, bus and subway payment, mobile payment, and other close proximity scenarios.<sup>[2]</sup>

### ZigBee Technology

ZigBee is a bidirectional wireless communication technology with short transmission distance, low complexity, low power consumption, low data transmission rate, and low cost. It is mainly used in fields such as close-range data collection and monitoring, automatic control, etc. The core protocol was developed by the IEEE802.15.4 working group, and its scenario application, testing work, and marketing are the responsibility of the ZigBee alliance. ZigBee has the following technical characteristics.

The working frequency band is flexible and can operate on three frequency bands: 2.4GHz (globally popular), 868MHz (popular in Europe), and 915MHz (popular in the United States).

The effective transmission distance of a single node signal is between 10 meters and 75 meters.

On the three operating frequency bands, the highest transmission rates are 250kbit/s, 20kbit/s, and 40kbit/s. The data transmission rate is relatively low, so it is mainly used in applications with low data volume transmission.

The network capacity is large, and each coordinating node in the ZigBee network can connect up to 255 nodes. A ZigBee network can accommodate up to 65535 nodes. There are three main topologies of the ZigBee network: star network, mesh network, and hybrid network.

The protocol is simple, with relatively low overhead and low power consumption. Therefore, the above characteristics of ZigBee make it widely used in some fields, mainly including smart homes, industrial control, sensor networks, and medical monitoring. ZigBee network can connect various electronic devices or sensors, and then connect to the Internet or specific servers through the gateway to provide monitoring management or control tracking services.<sup>[3]</sup>

### 433 MHZ TECHNOLOGY

As the name suggests, 433MHz wireless technology is a wireless transmission technology that operates in the

433MHz frequency band. Its main characteristics are as follows.<sup>[4]</sup>

Firstly, this frequency band belongs to the exemption of application for transmission and reception in China, and can be used directly without the need for application and approval.

Secondly, the wireless signal in this frequency band has strong diffraction ability, good penetration, and can propagate further, making it suitable for complex occlusion and other environments.

Support various point-to-point, one-to-many wireless data transmission and communication methods. Currently, many 433MHz wireless modules are integrated, with the characteristics of integrated transmission and reception, simple use, stability and reliability.

#### ANALYSIS OF THE CURRENT SITUATION OF ONLINE GAMES AND TECHNOLOGY

This chapter will provide a detailed and in-depth analysis of the application characteristics of large-scale online games, and summarize the architecture requirements of large-scale online games. At the same time, an in-depth analysis of the current state of technology adopted will be conducted, and the actual problems solved by the corresponding technologies will be summarized. In subsequent chapters, the conclusions and solutions of the paper will be discussed in depth based on the characteristics of the technologies mentioned.

#### Analysis of Large Scale Online Games

Online game elements refer to the total of all elements that players can come into contact with in the game, which can be interacted with in certain ways, such as game scenes, game storyline, game music, etc.<sup>[5]</sup> These elements are intuitively felt by players while exploring the game world. Game elements are the closest and most intuitive part that players come into contact with while playing the game. Chapter 10 of Introduction to Gameplay mainly introduces the various elements of RPG game design. As shown in Table 1 below, the main content of the game elements in Introduction to Gameplay is presented.

Table 1: Introduction to Gameplay Game Elements

Elements	Mechanics
Scene	Areas that Players Can Reach
Role	Characters in the Game
Prop	Props Used by Players
Event	The Plot Is Triggered by Meeting Certain Conditions
Dialogue	The Main Way of Describing the Plot

This paper studies the spread of Chinese culture in Genshin Impact, which has its own characteristics. Therefore, the author will demonstrate it mainly from four elements: game plot, game scene, game music, and game text. At the same time, from the perspective of McLuhan's media senses, the scene, music, and text elements are attributed to the visual and auditory design of the game based on the two aspects of human perception, while the plot and holidays are attributed to the plot setting of the game.

The visual and auditory effects of games directly affect the human senses. Visual effects, as the name suggests, refer to the game elements that the human eye comes into contact with, giving people the most intuitive feeling. Auditory effects refer to the game sound effects that affect the human ear, including background music of the scene, music used to set off battles, and so on. The game scene refers to the area that players can reach in the game. The game scene directly affects the connotation and expressiveness of the game, and is also the main platform for players to communicate with the game world. The most basic elements of the game scene are landscape and architecture. Genshin Impact mostly refers to the Chinese scenic spots and classical buildings displayed in the game. The main function of game scenes is for players to explore the game world and create a platform, showcasing the cultural and natural characteristics of the place where the game plot takes place. For example, Liyue in Genshin Impact takes China as the prototype, creating an antique world for players. The game scene is the most intuitive element that reflects national culture, and the charm of Chinese culture can be displayed everywhere in the game, from the overall visual design to the flowers and trees. Chinese classical architecture is an important component of China's national culture. The magnificent glazed tile architecture, the small and elegant Su-style gardens, and the round sky and square tower design all reflect the level of craftsmanship of a great country. Therefore, incorporating diverse architectural features and the unique natural beauty of China into the design of game scenes through freehand brushwork style, showcasing Chinese cultural characteristics in the game, immersing players in the national atmosphere presented in the game scene, and enhancing their sense of national cultural identity, is an effective means of spreading Chinese culture.

#### Functional Division of Online Games

The architecture design of information systems will be deeply influenced by the characteristics of the application. Only by fully exploring the characteristics

of the application itself can the most reasonable and effective system structure be designed. Therefore, this section will provide a summary analysis of the product and server characteristics of online games, fully summarizing their common features. These features will provide a sufficient basis for summarizing the architectural design principles of large-scale online games.<sup>[6]</sup>

Game is a comprehensive way of entertainment, which is the representative of the entertainment provided for users since the birth of the Internet. Therefore, games often cover all services that the Internet can provide, and will be applied to various technologies created by computer development.

In terms of product and service classification for large-scale online games, the services provided by large-scale online games are generally divided into two categories:

- Universal product services, including instant messaging, data security authentication, user account management, payment management, etc;
- Game product gameplay services, including unique gameplay systems, combat systems, map systems, character systems, etc. for each game.

### Cultural Characteristics of Online Games

Online games have a fantasy nature. Online games advocate freedom and resistance, the initial audience of network culture is young people, young people entering society and school teenagers who are oppressed by the workplace bosses or schoolmates' oppressive education pressure and can not breathe, so they need to fight, fight is the era of young people with distinctive features, it is under heavy pressure, all kinds of dilemmas, young people are often used to cope with, is the spirit of relief and emotional catharsis of the It is a breakthrough for spiritual relief and emotional catharsis. Its manifestations can be divided into two main forms: resistance to the culture and system of their fathers, and resistance to the mainstream culture and social rules. But the reality is that a group

of newborn calves can't fight against the ideological system in reality, so they flock to the embrace of the network. The freedom and resistance promoted by online games is only a virtual purgatory created for them, which satisfies people's psychological needs and is full of fantasies.<sup>[7]</sup>

Online games pursue aesthetics. Aestheticism is the biggest highlight of online games, the construction of the network world is based on the reality of the "beauty" of the imagination,<sup>[8]</sup> the imagination of the "beauty" of the reality. The aestheticism of virtual characters and environment maps the aesthetic concept of young players. The aesthetics of online games are centered on the visual level, the eye is an important organ for human beings to receive information, and very often, the picture often determines people's expectation of work, and a beautiful picture performance will make people more willing to go to see and play.<sup>[9]</sup> Chinese animation or games pay more attention to the educational significance of the plot and text and often ignore the beauty of the picture setting, for example, "Lion Boy" has a very good reputation, but because of the ugliness of the characters and caused a big uproar in the country, and ultimately the box office failed miserably. Network game culture, on the other hand, takes the picture as the first priority, attracts the audience through the beauty of the picture, and then enriches the plot. Moreover, online game culture itself is a fantasy country, a beautiful picture with a relaxing plot, can let the audience's mind get healed and comforted, in line with the audience's psychological expectations. The development team of "Genshin Impact" has drawn extensively from the aesthetic styles of Japanese anime and Western culture. This includes the incorporation of the "Impact" worldview from "Neon Genesis Evangelion" (EVA) and gameplay elements and dungeon mechanics from "Dungeons & Dragons" (DND). Such integration has enabled the product to challenge the stereotype that Chinese game developers lack cultural depth in their creations. Additionally, it positions Chinese online games to potentially compete for prestigious international awards, such as The Game Awards (TGA) in the United States.

Table 2: Explanation of the Basic Information of the Interviewee

Interviewee	Gender	Age	Career	Game Duration	Anime Understanding
F1	Male	30 Years Old	Game Modeler	15 Years	Moderate Users
F2	Female	25 Years Old	Entrepreneurs	20 Years	Heavy User
F3	Female	24 Years Old	Postgraduate	10 Years	Mild Users
F4	Male	27 Years Old	Entrepreneurs	15 Years	Moderate Users
F5	Female	25 Years Old	Postgraduate	10 Years	Mild Users
F6	Male	19 Years Old	College Student	3 Years	Moderate Users



### Research on Online Game Enthusiasts and Users

While most scholars believe that online game culture is constantly approaching mainstream culture, the authors arguing that in the development of contemporary online game culture, there is a counter-collective trend towards mainstream culture. Table 2 below shows the basic description of the situation of our interviewees in this interview.<sup>[10]</sup>

The continuous expansion of user scale and market share is the most direct manifestation of the enhancement of online game discourse, after 2015, China’s online game culture has shown explosive development, and the number of users has continued to expand (Figure 1), and the data statistics of pan-secondary yuan users in 2021 has exceeded 450 million people, on the one hand, benefiting from the favorable trend of the social environment, such as the support of the policy sector, the promotion of capital, and the mainstream voice recognition, the official transformation of the discourse form, the initiative to embed the online game culture field, the attempt to break the wall, but also from the side of the online game culture discourse; on the other hand, the online game group itself the value of the turn and identity needs, the number of online game users climbing, and constantly expanding the influence of online game culture.<sup>[11]</sup>

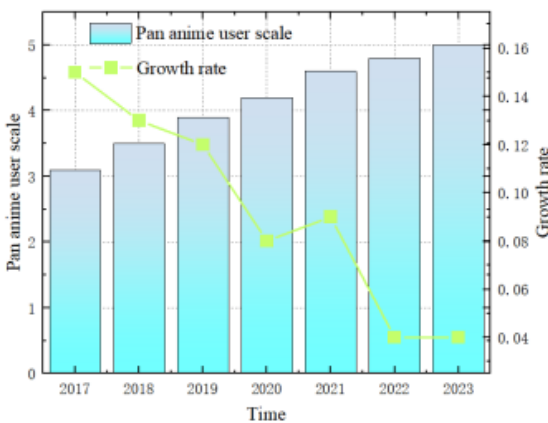


Fig. 1: China Online Game User Size and Growth Rate, 2016-2023

### Increasing Wireless Communication Technology in Online Games

Wireless communication technology” were never main to be use to developing ‘mobile games’. The Chinese mobile gaming industry, which began its development in the late 1990s, has evolved through multiple stages to become a significant force in the global market. This evolution can be traced back to the early exploration phase from 1998

to 2003, marked by simple games like Nokia’s “Snake” on Symbian systems. The proliferation of feature phones between 2004 and 2007 introduced the SMS billing model, allowing users to download JAVA-developed games through platforms like Mobile DreamNet. The period from 2008 to 2011 saw the rise of the in-app purchase model with the advent of smartphones, enhancing user experience and revenue generation through app markets. From 2011 to 2013, card games such as “I Am MT” gained popularity, with companies like Tencent expanding their market presence. Since 2013, with the widespread adoption of smartphones and advanced mobile internet technologies, Chinese mobile games like “Honor of Kings” and “Onmyoji” have achieved global success. Key milestone games include “Snake,” “I Am MT,” “Honor of Kings,” and “Genshin Impact,” each marking significant advancements in mobile gaming. This industry’s growth has significantly impacted communication technologies, driving the advancement of 5G technology—gaming contributes about 46.3% to 5G’s progress due to high bandwidth and low latency demands—and promoting the chip industry, with gaming technology accounting for approximately 14.9% of its advancements.

This kind of network opinion leader with high fan stickiness and influence has formed a subtle influence on game players. 2015, along with the explosive development of China’s online game culture, the game market continues to expand (Figure 2), the statistics of the online game market in 2021 exceeded 50 billion yuan, and the development of the online game industry has gradually matured, there are high-quality games, and with the game industry, the development of the game has become more and more mature, and the development of the game is more and more mature, with high-quality games, with the game industry, the development of the game is more and more mature.<sup>[12]</sup>

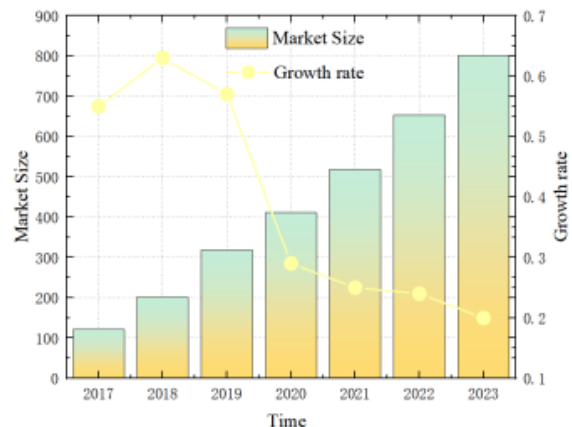


Fig. 2: China Online Game Scale and Growth Rate 2016-2023

## THE APPLICATION OF WIRELESS COMMUNICATION TECHNOLOGY IN ANIME GAMES

### The Development and Current Situation of Wireless Communication Technology

It quickly extended from twisted pair and cable lines to application standards for personal wireless networks. Bluetooth was founded by Ericsson in Sweden, and Ericsson began developing Bluetooth in 1994. In 1997, Ericsson contacted other equipment manufacturers and sparked their strong interest in this technology [13].

The Bluetooth protocol specification follows the Open Systems Interconnection Reference Model (OSI/RM), and the Bluetooth specification V2.0 developed by Bluetooth SIG aims to allow applications that comply with the specification to interoperate. In order to achieve this interoperability, the corresponding applications on remote devices must run on the same protocol stack [14]. The relationship between a complete Bluetooth protocol stack is in Figure 3.

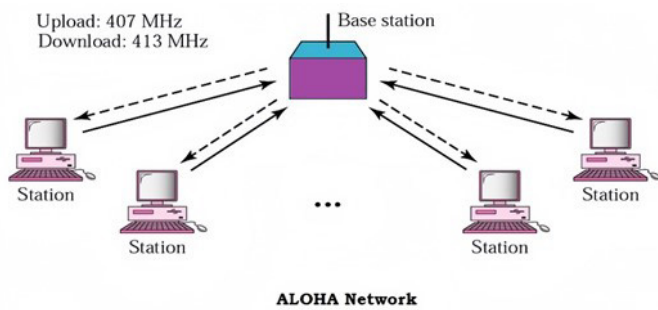


Fig. 3: Complete Diagram of Bluetooth Protocol Stack

In addition to the protocol layer mentioned above, this specification also defines the host controller interface, which serves as a command interface for baseband controllers, control registers, connection controllers, and hardware status. In the above figure, the host controller interface is located at the lower level of L2CAP, but it can also be located at the upper level of L2CAP.<sup>[15]</sup>

### Application Scenarios of Wireless Communication Technology in Anime Games

From a software level perspective, the Android application open platform consists of Applications, Application Frameworks, System Libraries, Android Runtime, and Linux Kernel (Figure 4).

The steps in the development of online games are generally the planning of the game, feasibility analysis, requirement analysis, design of functional modules, creation of resources such as pictures and sound effects, writing of game-related code, game testing, and

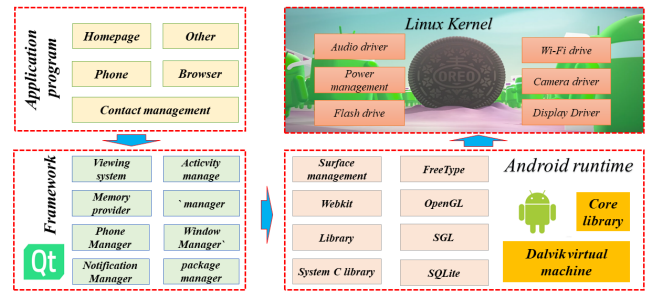


Fig. 4: Android Platform Architecture Diagram

maintenance. The flow chart of specific mobile game development is in Figure 5.



Fig. 5: Anime Game Development Flow Chart

Whether it is software or game development, the framework is divided into three layers, namely the Model layer, the View layer, and the Control layer. This MVC development model is still universally effective in Android model development.<sup>[16]</sup>

In online game development, the control layer is the main Activity to control the entire game process, through which you can set the sound effects, view the help interface, enter the game interface, etc., it is the core of the entire development framework. Model layer is the encapsulation of specific objects in the game, the view display layer is divided into two display modes in the game, the two-dimensional game interface is through the View, Surface View is a graphical display of the base class, the user can go to the inheritance of the class to achieve the three-dimensional game is to display the view interface through the implementation of this interface.<sup>[17]</sup>

### Multi-threading Mechanism in Games

In daily applications, we usually handle some operations not visible to the user in the background. For example, we need to download a video, but your application must wait for the user to complete the download before proceeding with other operations.<sup>[18]</sup> In this

case, we usually let these operations be executed in the background and then wait for the background to complete the execution before popping up corresponding prompt messages for the user.<sup>[19]</sup> At this point, we need to use a multi-threaded mechanism and then execute these operations by creating a new thread. The multi-threading technology in anime games is mainly handled through the Handler class, communicating with the main thread.<sup>[20]</sup>

The threading mechanism in the anime game is that you can only interact with users in the UI thread. When we created a new thread and performed some backend operations, we wanted to pop up a dialogue box for the user to confirm, but unfortunately, we found that we could not return to the UI main thread at all. The UI thread is the thread to which the interactive interface you view belongs. At this time, if we want to implement these functions, we need a handler and message mechanism provided by anime.<sup>[21]</sup>

We usually create a handler in the UI thread, which acts as a processor and is mainly responsible for handling and binding messages in the threads bound to that handler. Each handler must be associated with a looper, and the two correspond one-to-one. In addition, it is responsible for taking out individual messages from its internal message queue to the handler for processing. Because we implement it in a thread, we can return to the thread through such a handler and message mechanism [22]. The main methods used in this process include message, what, and message. argl, etc. The specific multi-threaded processing flowchart is in Figure 6.

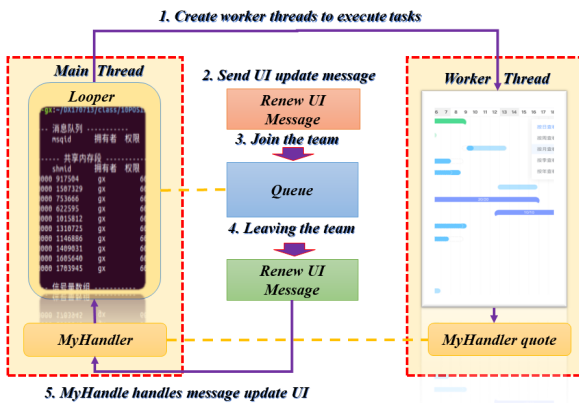


Fig. 6: Multi Threading Technology Flowchart

### CASE STUDY OF GENSHIN IMPACT

#### The Communication Effect of Genshin Impact Game

Genshin Impact is an open-world adventure game produced and published by Shanghai Miha Tour, which was released on September 28, 2020, for public beta testing. In terms of data, with the same official server,

account data is interoperable between iOS, PC, and Android platforms, allowing players to switch devices under the same account.<sup>[23]</sup>

The main income of the game comes from character draw cards. Characters controlling different elemental powers will enter the player's team in the form of draw cards, which will enhance the player's combat power and update the game's combat methods.<sup>[24]</sup> The huge world map and various NPCs provide countless quests, and players need to get relevant information in the form of talking to people like in the real world, the game is rich in content and lasts a long time. HoYoverse's standalone social app, Hoyolab, regularly launches creator incentive programs to enhance user engagement. These initiatives encourage content creators from various streaming platforms to promote Genshin Impact in exchange for in-game resources. The first phase of media coverage and headlines are in Table 3.

Table 3: First Stage Media Coverage and Titles

Reporting Time	Reporter	Report Title
2020-06-11	Titanium Media APP	"Genshin Impact" Came and Resumed the Eight-Year War History of Miha Tour
2020-08-21	Bilibili	True Fragrance Warning? Miha Tour "Genshin Impact Genshilmpact" Overseas Official Website Booking More Than One Million
2020-09-23	Rednet	The Launching Ceremony of Zhangjiajie and Miha Tour's Strategic Cooperation Signing "Genshin Impact" Transmission Point Was Held
2020-10-03	Big talk and Small Masturbation Circle	Why Is the Anime Game Becoming More and More Popular? Maybe Genshin Impact Can Give an Answer
2020-10-13	Bilibili	Who Is Paying for Genshin Impact

Table 4 presents the basic information of the top 10 videos as of November 1, 2022 in the ranking. The top three videos in the ranking were finally crawled due to relevant technical limitations.<sup>[25]</sup>

#### Characterization of Game Design Transmissions and Expressive Behaviors in Genshin Impact

In this study, the author elaborates on the participatory behaviors of cross-cultural fan circles by dividing them into four dimensions, namely, the connection dimension, the expression dimension, the cooperation dimension,

Table 4. Top Three Videos of Official Account of Genshin Impact on YouTube

Ranking	Video Title	Viewing Volume	Comment Volume	Like Count
1	Genshin Impact Story Teaser: We Will Be Reunited	3000000	21137	413000
2	Character Demo-Zhongli: The Listener	2900000	50972	513000
3	Collected Miscellany-Qiqi Fortune-Pre-serving Talisman	2600000	5884	106000

Table 5: Basic Information of Respondents

Respondent's Nick-name	Age	Gender	Nationality	About the Number of Media Platforms Used by Genshin Impact
C.I	30	Female	America	3
Dawn	18	Female	America	5
Gab	21	Male	Canada	3
Hayden	17	Male	Malaysia	4
J	16	Male	Malaysia	4

and the dissemination dimension.<sup>[26]</sup> Specifically, the connection dimension focuses on how cross-cultural fans maintain connections with the game and between fans inside and outside the game; the expression dimension focuses on how cross-cultural fans use different forms to create and express themselves around Genshin Impact; the cooperation dimension focuses on how cross-cultural fans collaborate with each other in different forms, such as producing knowledge, community management, and solving problems together; and the dissemination dimension focuses more on how cross-cultural fans disseminate media content related to The Genshin Impact in different social media. The format of the in-depth interviews was an online text exchange with nine cross-cultural fans of Genshin

Impact.<sup>[27]</sup> To protect the privacy of the interviewees, the names of the interviewees appearing in this study are pseudonyms. Table 5 shows the basic information of the interviewees.<sup>[28]</sup>

In addition to focusing on online opinion leaders in the gaming industry, the publicity for Genshin Impact utilized multiple platforms to satisfy the differences in audience media use,<sup>[29]</sup> forming a communication synergy across multiple platforms (e.g., Table 6), and utilizing the developmental advantages of the platform media to draw audiences to Genshin Impact from a certain platform, which is what makes HoYoverse's publicity so unique.<sup>[30, 31]</sup>

Through user surveys and interviews, we have discovered that HoYoverse and its parent company miHoYo have

Table 6: Incentive Measures for Platform and Genshin Impact Propaganda

Platform	Incentives
Bilibili	Bilibili released the main incentive plan of "Genshin Impact" and set up rewards such as 200000 yuan for the popular anchor, 100000 yuan for the popular anchor, 100000 yuan for the popular anchor, as well as traffic support, operation guidance and other support and rewards.
Tiger Tooth	In the Tiger Teeth platform, the recruitment of Genshin Impact anchor is a six-figure prize pool. Players can start live streaming after participating in the corresponding public beta QQ group. The activities are divided into 500 opening prizes, ten popularity prizes, ten duration prizes, and several union prizes. The rewards are divided into cash and game stones, and outstanding anchors can have the opportunity to sign contracts with the official.
Douyu	On the Douyu anchor platform, the information also invites Genshin Impact. After logging into the Betrayer account, you can register for Genshin Impact anchors. The awards are divided into 500 new anchor awards, 30 popular live broadcast awards, and three live broadcast frequent awards, including cash and original stone awards.
TikTok	On the TikTok platform, Genshin Impact registered an account in May 2020, four months before it went online. The main release was the game's tasks, pictures and storylines. The broadcast volume of many topics was more than 100 million. Users produced the main videos, and a group of users who only produced Genshin Impact videos were born.



gradually developed a dominant MMORPG model centered around promoting the gacha system in Chinese anime-inspired online games, based on the design of Genshin Impact. Under this model, due to community ranking anxiety and players' emotional investment, a significant number of users engage in substantial spending to enhance their main characters' strength and appearance. Notably, characters with superior design and more comprehensive story backgrounds often have weaker base stats, requiring players to spend more on obtaining constellations to strengthen them. Conversely, characters with relatively simpler designs tend to have stronger base stats, compelling players to invest in enhancing their character box to mitigate the increasing difficulty of game progression in later stages.

### The Application of Wireless Communication Technology in Genshin Impact

The communication protocol utilized by "Genshin Impact" is UDP: KCP. KCP is a transport protocol based on UDP, designed to enhance the reliability and speed of data transmission. In contrast to the traditional TCP protocol, KCP implements congestion control and packet retransmission mechanisms at the application layer, thereby offering more efficient and stable data transmission on the inherently unreliable UDP foundation. This makes it particularly suitable for applications requiring low latency and high real-time performance, such as online gaming. Through the KCP protocol, "Genshin Impact" maintains a smooth gaming experience even in complex network environments, mitigating latency and lag caused by network fluctuations.

Moreover, this protocol supports cross-platform and multi-hardware cloud storage functionality, accommodating iOS, Android, HarmonyOS, and Windows operating systems. This allows players to access their accounts across multiple devices in a distributed manner, enabling continuous gameplay regardless of their physical location. Consequently, players can integrate the game into their daily routines according to their personal schedules, ensuring that the characters crafted by Hoyoverse are available to accompany them at all times.

### CONCLUSION

In this study, we conducted an in-depth discussion and research on the transmission and expression of online game design elements based on wireless communication technology. By analyzing existing wireless communication technologies and online game design elements, we propose an effective transmission and expression design

scheme, and experimentally verify and evaluate it.

Adopting the transmission and expression design scheme of online game design elements based on wireless communication technology can effectively improve the real-time performance, stability and user experience of the game. By optimizing the transmission algorithm and design element expression, we achieve efficient transmission and expression of elements such as character movements and scene changes in the game, which reduces the network delay and bandwidth occupation, and improves the smoothness and response speed of the game.

In online game design, it is crucial to choose and utilize wireless communication technology reasonably. Different wireless communication technologies differ in transmission speed, stability and cost, and need to be selected and adjusted according to the characteristics and needs of the game. Therefore, we suggest that game developers should fully consider the characteristics of wireless communication technologies when designing online games, and flexibly utilize them in combination with the actual situation in order to achieve the best game performance and user experience.

In this study, we take the online game "Genshin Impact" as a case study, and conduct in-depth research on the transmission and expression of online game design elements based on wireless communication technology. Through our research on the integration of wireless network protocols with mobile Anime-style games, we have observed miHoYo's ongoing success with titles like "Honkai: Star Rail" and "Zenless Zone Zero" in the mobile MMORPG market, building upon the achievements of Genshin Impact. These games utilize randomized gacha mechanics to acquire "constellations," exclusive weapons, and artifacts, appealing to a substantial player base willing to invest significant time and money. This demographic predominantly consists of middle-class players who own smartphones, personal computers, and even household consoles like the PS5, all precisely targeted by miHoYo. By facilitating seamless cross-platform connectivity across mobile, PC, and console platforms, miHoYo offers an immersive Anime-style gaming experience, tailored for urban audiences continually engaged through wireless communication technologies.

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