

The Linkage between Personality Traits and Type, Frequency and Motivation of Mobile Games in the Web 3.0 Era

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Abstract. Various gamers' psychology has become a hot topic nowadays. Since the video game is changing in the Web 3.0 era, and the popularity of video games is increasing annually, becoming the dominant platform of the entertainment industry. It is important to analyse the reason why people like to play video games, since it can bring benefits to relevant organisations, such as game organisations and prevent game addiction problems. But there are not enough analyses relating to people's motivation and frequency of playing video games. Regarding the Big Five theory, Maslow's needs theory and U&G theory, this study analyses the linkage between video gamers' motivation and behaviours. The main findings of this paper indicate the relationship and connection between gamers' personality, playing behaviour, motivation to play video games, and game theme preference. In conclusion, this research developed a complicated theoretical framework based on the existing theories, highlighting a high relevance between gamers' personality and their gaming behaviours. Moreover, it provided practical implications for both individuals who play video games and platforms, aiming to create a sustainable online environment.

1 Introduction

With the accelerating evolution of the internet, society is approaching the Web 3.0 era. Web 3.0 is an internet structure with decentralised features, reshaping people's lives, giving online users more protection and rights [1]. Blockchain strategy is one of the core improvements of Web 3.0; it makes the user more engaging and transparent [2]. During the Web 3.0 era, online users had the right to control their data and more freedom to do things online. Video games are a typical illustration of Web 3.0, where people can unwind and interact with others through a fictional world. Nowadays, video games have become the dominant platform in the online entertainment industry [3]. Moreover, the number of gamers is increasing rapidly, and laptop video games and mobile phone video games occupied 51% of the total income in the gaming industry [3].

This research is important because playing video games on mobile phones is becoming a social phenomenon. Meanwhile, video games can bring more benefits to people. The research indicates that video games can reduce people's chronic pain, increase their spatial perception,

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and improve their team cooperation and leadership ability [4]. It is important to analyse people's purpose of playing games. Deeply understanding gamers' motivation and needs can help game designers gain more profit, create more popular games, clearly know their target game setting, and make improvements.

To sum up, understanding gamers' motivation and needs can prevent game addiction problems. Meanwhile, this research also shows that negative barriers will occur when gamers rely too much on video games and threaten people's real lives. Game organisations can take actions to prevent gamers from becoming addicted to games [4]. Thus, it is necessary to analyse the relationship between video games, gamers' personalities and gamers' playing behaviours. The core target for this research is to understand the theoretical connection between gamers' personality features and gaming behaviours. This paper aims to analyse the potential associations between different types of mobile games, gamers' gaming frequency, and personality traits.

2 Literature review

2.1 Changes in the video game's marketing

Kattilakoski indicates the main reason that led to the increasing popularity of video games is the digitalisation trend through society and the change in people's perception of video games [3]. In the past, video game players were always in front of the PC or laptop and played in a stable place [3]. With the development of the internet and the trend of digitalisation, the way of playing video games has become more portable; there are more mobile video games in the video game industry, and mobile games occupied 54 per cent of the total video game industry [3]. Thus, the portable game types lead to the number of gamers increasing. Meanwhile, the sources of the game company's income have changed as well. In the past, the main income came from selling video games themselves, but now the paid content has become the main income for game companies. Thus, the market structure change can be linked to different gamers' motivations to play video games.

In the past, video games were not as popular as today since the development of Web 3.0 has made video games more attractive towards people. From previous research, the biggest change in the Web 3.0 era is the blockchain strategy. The decentralised structure makes the information more transparent and makes the game environment safer to prevent the threat of hackers [2]. Moreover, gamers have more rights to control their game playing, such as NFT, it refers to the term of fictional property owned in the game; gamers also have the right to trade or own and collect their property [2].

Apart from that, gamers are allowed to earn value in games as well, since there are some gamers who will trade their fictional property to earn bigger value, such as Quartz, which is an online platform that allows gamers to trade NFTs [5]. To sum up all the ideas, the reason why it is becoming more popular is that video games can satisfy more gamers' needs.

2.2 Influence of video game playing on the individual

Malek et al's research mainly focuses on students' game frequency and their study performance. The research indicates that the number of male gamers is higher than females, and the frequency of playing games does not have a clear connection to study performance, but the students who play games more frequently have lower possibilities of performing well in their studies [6]. Thus, the frequency of game playing will affect the quality of life and work or study performance. On the one hand, it may bring a harmful impact to human life. Malek et al indicate that moderate playing of video games can stimulate the neuro system

and provide better study or work performance [6]. Meanwhile, according to Shi et al, playing video games can bring benefits to gamers as well, such as improving leadership and team cooperation activity, and preventing PTSD or chronic pain [4]. On the other hand, playing too many games will also cause game addiction problems, which is a type of mental disorder that will affect people's lives [4]. Spekman et al.'s research indicates that game addiction is roughly defined by positive or negative motivations that are relevant to the analysis in this research [7]. Finally, Spekman et al.'s research shows that game addiction is caused by high-frequency game playing, defined by different scales and the positive or negative motivations [7]. On the other hand, Malek et al.'s research shows that high frequency of playing video games and poor performance in study are positively correlated [6].

2.3 Genre of video games and motivations

There are several different types of video game genres, and the different types can satisfy different gamers' needs. It is hard to measure the popularity of different video game genres, and the results of the most popular genres in different regions of the world are different. Thus, it is necessary to choose a typical dataset. Finally, the data of popular game genres are chosen from the gamers' performance in China. Since China have a huge market of video games, it occupies over three per cent of the global video game market and the market value and gamer numbers are annually increasing [8]. The total market value of the Chinese video game market is 341 billion dollars; it is a valuable data basis for further analysis [8]. In this research, game genre refers to the top 5 most popular genres they are puzzle, MOBA, battle royal, shooter and roleplaying [8].

3 Theoretical framework

3.1 Big five

From previous analysis, gamers' motivations and needs that games can satisfy are clearly indicated. One of the biggest factors that will affect gamers' motivation and behaviours in game playing is their personality. Big 5 models will be used in this research to get the relationship between gamer's factor and their gaming behaviour. The Big 5 model is a diagram that will represent people's different personalities from five different ranges, including Extraversion, Openness, Agreeableness, Neuroticism and Conscientiousness [9]. Extraversion refers to the person whether a person is easy to interact with, Openness can indicate whether a person is always think creatively and always like to take adventure, Conscientiousness means whether a person is easy to take the responsibility in work or life, agreeable ness will manifest this person's emotional appealing ability, neuroticism means whether a person is easy to suffer from stress and anxiety [9]. This 5-dimensional diagram will be the basic framework to measure a gamer's personality.

Moreover, gamers' motivation is the agent in this framework (information, personal identity, social interaction and entertainment). In fact, different motivation will determine their frequency of playing video games. In conclusion, gamers' personality determines the motivation for game playing, and motivation determines gamers' playing frequency. The connection between motivation, gaming frequency and genre choice can be analysed based on Maslow's needs theory and use and gratification theory.

3.2 Maslow's hierarchy of needs

Maslow's hierarchy of needs is a theoretical framework to illustrate the different levels of needs in humans' daily life, which can be divided into five levels. When lower levels of needs are satisfied, people will be seeking to satisfy higher levels of needs [10]. The lowest level of needs is psychological needs it refers to the needs to keep the person alive such as air food and water, the second lowest level of needs are safety needs it means the needs of protection and avoid from outer threat, the third level of needs is love and belongingness needs this level of needs refers to the get emotional relationship and seen as a part of social group [10]. Moreover, the second highest level of need is self-esteem needs; these needs mean the person is being respected and accepted by the public, and the highest level of need is self-actualisation, which refers to the need to achieve lifetime goals [10].

In contrast to the game evolution in the Web 3.0 era, video games can satisfy a higher level of needs, which is the reason why more people are motivated to play video games. In the past Web 2.0 period, video games were a medium for people to interact, communicate and get the sense of being in a part of the group with the same hobbies. Thus, video games mainly satisfy the love and belongingness need. But now, Web 3.0's development allows video games to satisfy people's higher level of needs. When people perform well in the game and get a high rank, they may gain a sense of self-esteem, and when people gain a huge income while trading their NFT, they can satisfy the needs of self-actualisation.

3.3 Use of gratification theory

Video games' evolution is increasing level of satisfaction is highly relevant to the core assumption of the Uses and Gratifications theory. Uses and Gratification theories refer to the media users are mediums to satisfy and fulfil psychological needs using media platforms [11]. The Uses and Gratification theory contains four types of motivation in using media platforms: information, entertainment, social interaction and personal identity [11]. In Web 3.0, gamers are the intentional users of video games, and the gratifications that games can bring are not limited to entertainment but also social interaction and other motivations. While the video game is developing, people have more diverse motivations to play video games, and their motivations can connect to their own personality.

4 Big 5 personality features and game genres chosen

There is a correlation between the five personality traits and the game types selected by users. This article compares the currently popular diverse game types with the different personality traits proposed by the Big Five Personality Theory and explores the possible relationship between the two (Table 1).

Table 1. Examples of different personality traits and suitable video games.

Personality traits	Openness	Extrovert	Neuroticism	Agreeableness	Conscientiousness
Suitable video games	RPG Puzzle	MOBA Shoot	Battle royal Shoot	MOBA Shoot	RPG Puzzle

More extraversion people will have more intention to communicate and be noticed by others [9]. Thus, the game genre with more competitiveness, team cooperation and communication function. MOBA games are the game genre that more extraversion people will choose. Since online MOBA games are the source of complex and diverse online

communication, and the high-quality positive social interactions in MOBA games will improve their sense of satisfaction while playing games [12]. Another game genre extrovert gamers will choose is the Shoot game. Since the shoot game needs a lot of team cooperation to win the game, and the communication between team gamers is vitally important. Thus, an extroverted person will also be attracted to shooting games.

When a person is highly open, they will be creative and have more creative; in other words, they are easier to accept new thoughts and take risks [9]. Thus, RPG games and puzzle games can fulfil more openness in gamers' personality features. Since the role-playing game genre always provides a fictional and unknown background, it allows gamers to explore while they are playing. Since the most attractive part of a Role-playing game is to see the character become stronger while exploring the fictional world, that will bring gamers a sense of satisfaction [13]. Thus, RPG games' feature of exploring takes risks and makes the character stronger will attract people with highly open personalities. Moreover, puzzle games are also attractive for gamers who are highly openness. As puzzle games are challenging for gamers to solve, and high openness gamers like to take risks and face challenges and then they are more intended to play puzzle games as well.

High Neuroticism gamers are more likely to suffer from anxiety and faster to identify the outer threats [9]. For example, battle royal games are one of the most attractive game genres for this type of gamer. Since the Battle Royale game is a game genre which requires a lot of assumptions for the threat from other gamers and tries to beat down more gamers to win the high ranks. Thus, gamers with high neuroticism personalities have better risk assessment ability and will perform well in Battler Royal game since they can faster notify the threats, like the place of other gamers, because they have a more sensitive neuro system. Meanwhile, the shoot game genre is also a type of game that will meet high neuroticism gamers' personality features, high stimulation, and high nervousness game sphere can help them unwind themselves.

High agreeableness personality gamers will have high emotional appeal ability and love to take care of others [9]. Thus, MOBA games and shooting games will still attract this type of gamer. These two game genres require a lot of cooperation. In contrast to the extrovert gamers. Communication and interaction are not the main features to attract them, but they can take care of other gamers in the same team and enjoy the feeling while collaborating.

Gamers with high conscientiousness personalities always take their responsibility seriously both in playing games and daily lives [9]. Thus, the video game genre with mission-oriented and clear goals will easily attract them. Motivated mission features can be seen in role-playing games and puzzle games. Since the character will get more weapons and props in games while gamers will finish missions while playing RPG games. Meanwhile, the system with mission and progression can bring satisfaction for gamers [13]. While completing the missions, they can get positive feedback as they see their character have a higher level and become stronger. Moreover, puzzle games have the same core logic as RPG games; solving different problems is the core promoter of game development. It will also attract gamers with high conscientious personalities.

5 Personality and motivations to play games

From the previous section, it can be clearly seen that some of the different personality features will be attracted to the same or similar types of games. Such as a more open personality and a more conscientious personality, both personalities will be attracted to RPG and Puzzle game genres. Meanwhile, both gamers have more extroverted and more agreeable personalities will be attracted by the MOBA and Shoot game genre. But the biggest difference between them playing the same type of games is motivation. Obviously, people play mobile video games to satisfy their own needs, which relies on various reasons and motivations. As different

people have diverse personal values and different needs, there are distinct motivations for playing video games. This research put up a practical relationship between personalities and the corresponding motivations (as shown in Table 2).

Table 2. Personalities and the corresponding motivations.

Personality traits	Motivation
Openness	Express creativity; Fulfilling the desire to explore; Feel self-esteem; Satisfy self-esteem needs.
Extrovert	Communication, interaction, and gaining a sense of belonging; Build up relationships, expand the friend cycle. with other players; Satisfy love and belongness needs.
Neuroticism	Reduce outer stress and reduce anxiety; Get a sense of control in games; Satisfy safety needs.
Agreeable ness	Enjoy the scene of collaboration; Support the team to win; Satisfy self-esteem needs.
Conscientiousness	Gain scenes of self-fulfilment while winning a hard game level; Use the game as an entertainment platform; Satisfy self-esteem needs.

More extroverted gamers are good at communicating and want to build great relationships with others and gain respect from others [9]. Thus, these types of gamers are more eager to satisfy the needs of love and belongingness in Maslow's hierarchy of needs theory. What's more, video games mainly satisfy their own social and interaction needs. Video games provide them with a medium for them to interact and chat with others. Since social experience is one of the most important structures in the video game setting, the quality of social interaction has a deep connection to the satisfaction and positive emotions of gamers [9]. Therefore, the motivation for extrovert gamers to play video games is for communication purposes and to gain a sense of belonging.

Gamers with more open personalities are always creative and more curious to explore. RPG games and puzzle games will provide them with more fields to explore and express their creativity. For instance, RPG games' one attractive feature is the character evolution system, when the game player explores the fictional world and completes more missions, their characters will have better ability to beat stronger and harder enemies [13]. When gamers complete the game or beat the boss, they will gain a sense of self-esteem. Gamers with more open personalities will satisfy their self-esteem needs. Self-esteem needs refer to the needs of being respected and gaining acceptance from others in Maslow's hierarchy of needs theory [10]. Thus, the motivation for more open gamers is to satisfy their self-esteem needs and acceptance for their personal identity needs by exploring and expressing creativity in video games.

Conscientious personality gamers always take responsibility seriously and always perform well at work [9]. Same as at work, these types of gamers always take responsibility seriously. When they play games, rules and missions are the main factors to promote them to continue to play games. When they take serious responsibility to solve difficult problems and win a hard match in a video game. They will feel a sense of fulfilment. Moreover, the scene of fulfilment will satisfy their self-esteem and entertainment needs, as the scene of fulfilment they get, they will unwind themselves; thus, games are an entertainment platform for this type of gamer. In conclusion, their biggest motivation to play video games is for entertainment needs and to gain a sense of self-fulfilment.

People with high agreements always love to take care of others and make the people around them feel more comfortable [9]. Thus, the social and communication function in games can satisfy their need to care for others. In this way, they will gain a sense of love and belonging while they try to support team members and win the game. Thus, their motivation to play games is enjoying the scene of collaboration with other gamers.

People with neurotic personality are more likely to become anxious, sensitive to outer threat assumptions and always think negatively side towards life [9]. Moreover, games have benefits to reduce anxiety and other negative emotions [4]. Thus, neuroticism gamers are more intended to use video games as a platform to reduce stress and release their anxiety; meanwhile, their motivation to play games is to reduce the anxiety and gain a sense of control.

6 Motivations and frequency of playing video games

The connection between personality features and gamers' motivation to play games was manifested in the previous two sections. Gamers with different personalities will have different motivations to play games. Meanwhile, different motivations to play games will have a deep impact on gamers' frequency of playing games.

Gamers who are more conscientious are less likely to play video games at a very low frequency. Since their personality type determines that they have strong responsibilities in dealing with difficulties in their daily life [9]. Thus, they will always see games as a type of entertainment and strictly balance life and game. Extroverted gamers will have a middle to high frequency of playing games, since extroverted people have good communication skills and love to interact with others [9]. They will use games as a tool to do social communication. So, motivation determines their middle to high frequency in game playing. Agreeableness gamers will have a middle frequency of playing games. This indicates that a person with an agreeable personality loves the feeling while supporting others [9]. However, playing games is just an entertaining way, which is the reason why more agreeable gamers will have a moderate frequency of game playing. Neuroticism game players will have a high frequency in playing games, as they use games as an agent platform to avoid external stress and anxiety. Since high neuroticism people are highly sensitive to negative emotion [9]. They will have a higher risk of catching game addiction problems. Lastly, openness game players may have a medium to high frequency while playing the game, since they have creativity and love to explore unknown things [9]. Thus, they can be easily attracted by the content in video games. That makes them have a higher possibility of having a medium to high frequency of playing video games.

7 Conclusion

In this research, the importance of gamers' behaviours was analysed from the perspectives of psychology in the recent Web 3.0 era. First, introduce the background of developing a Web 3.0 environment. Second, the framework was introduced and expanded based on the BIG 5 model, Maslow's Hierarchy of Needs and Uses and Gratification theory. Then connected them by analysing the game genre and different gamers' motivations. Finally, this research can bring the basis for future analysis relevant to psychology and the video game industry.

This research mainly develops a combination of meta-framework between game playing frequency, gamers' motivation and personality. This framework clearly indicates the relationship and provides a complex connection between each of the three factors. This framework can be a reference for future research. It can help the gaming industry to know how the different personalities affect game behaviours. Since it expands the framework of

human needs theory, such as Maslow's hierarchy of needs and Uses of Gratification theory and makes the framework more relevant to today's digitalisation environment. This framework can also provide constructive benefits to the recent video game industry. Based on this framework, game designers can create diverse elements to fulfil different gamers' needs. That can make video games more attractive. Otherwise, game companies can also design advertising that is suitable for the target group, based on the outcome they get from the framework.

Another important benefit is the prevention of game addiction. The framework in this study helps game companies identify the personality type with a higher risk of game addiction and take action to protect gamers from developing it. Until now, this type of game addiction prevention has started to develop in China. In China, gamers under 18 years old are only allowed to play for two hours a game at 8-9 pm each Friday, Saturday and Sunday. This action is very similar to the function of the framework in this research. But if the framework is used more effectively in the future. It can create more flexible and mobile game addiction prevention programs. Gamers can use some questions to test users' personalities before they register for the game account.

There are still some limitations in this research. Measuring personality is not complete since people's personality is complex, and the dimensions of the Big 5 personality cannot be too polarised. To make it possible to apply the framework used in this study in the future, practical research like interviews and surveys could be conducted to discuss the best strategies to improve the performance of people's gaming behaviour and the features of their personality. Since it can manifest the accuracy and complexity of human motivation and personality, the framework utilised in this research could provide an insightful and applicable perspective for the studies relevant to personalities and video game playing.

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