BEYOND GENRES: EXPLORING THE RELATIONSHIP BETWEEN GAMER TYPES AND THE FIVE-FACTOR MODEL OF PERSONALITY

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ABSTRACT

This study explored connections between gamer personalities and motivations by examining relationships between personality traits and player types. A sample of 459 Turkish pre-service teachers completed the Gamification User Types Hexad Scale and the Five Factor Model of Personality questionnaire. Results showed Player, Disruptor, and Socializer types were the most common when considering both single and combined player profiles, indicating strong drives for rewards, boundary-testing, and social connections. Openness emerged as the most prevalent personality trait, reflecting curiosity and creativity among participants. Correlation analyses revealed notable alignments between traits and types, including positive relationships between Openness and Philanthropist/Achiever types; Extraversion and Philanthropist/Achiever types; and Conscientiousness and Achievers. These point to imagination, sociability, and achievement orientation underlying some gaming motivations. Conversely, the negative correlation between Conscientiousness and Free Spirits matches this type's carefree quality. While these relationships confirm connected traits and motivations, more research on causality and application is needed. This study sets the groundwork for personalized gamification approaches and underscores complex interplays between personality differences and player tendencies requiring further examination, particularly regarding impacts on motivation.

Keywords: Gamification, personality traits, gamer typology, individualised learning, pearson correlation.

INTRODUCTION

Games are essential concepts for people's learning processes. The activity of playing games is an innate instinct that enables people to recognize and make sense of their environment from a very early age. This instinctive orientation is the basic cornerstone of human learning. Therefore, it is claimed that games are the most effective and efficient source of learning for humans from an early age to adulthood and beyond.

Games can be played in a natural environment through interactions with the environment or the individual's inner self, or in digital environments as a result of developing technology. In both cases, games provide important learning interactions for the individual.

When games are reviewed in the context of learning, they can basically be categorized as traditional games and digital games. Digital games have emerged as a technological innovation that is now firmly embedded in modern culture, substantially influencing social interaction, education, and entertainment. Current projections estimate 2.7 billion video game players globally in 2020 expanding to 3.24 billion in 2021 (Newzoo, 2020; Statista 2021). This growth trend is expected to persist in 2022 and 2023 as well. The

continued proliferation of the gaming industry speaks to its entrenchment as a mainstream staple that shapes many aspects of the contemporary human experience. These data are generally accepted indicators of how important games have become worldwide. However, the personal characteristics and behaviors of gamers are not the same for all individuals/gamers. Players may differ in terms of their motivations, behaviors, preferences, and the time they spend playing games (Hamari & Tuunanen, 2014). The entire digital gaming market and traditional gaming activities used in education aim to increase their effectiveness by focusing on these individual differences. Today, learners who have grown up with technology are demanding learning processes that are easy to use, enable them to think quickly, and include visual and game features (Annetta, Folta, & Klesath 2010; Sezgin, 2020). Two of the main learning approaches used to design learning processes that meet these demands are game-based learning and gamification.

Game-based learning involves planning the learning process through a game (Sezgin et al., 2018). The learning process is experienced as a result of the game's scenarios and interactions. Gamification, on the other hand, is the use of game design elements in non-game contexts to motivate users, engage them in a learning process, and increase their productivity (Kapp, 2012). The main goal in gamification is not teaching, but adapting learners/players to learning. The main theoretical difference between the two approaches is expressed by Bozkurt (2014) as follows: "In a gamified process, you can feel the game design but you cannot see it. However, in game-based processes, you can feel and see the game idea."

Educational digital games, which have become a part of daily life with the developments in the field of gamification (Ferro et al., 2013), are used in various fields to improve learning (Chen, Shih, & Law, 2020) and affect individuals' socialization, entertainment, and learning experiences in many fields from education to health (Bouzidi et al., 2019). Players have different motivations when playing digital games, such as achieving success in the game or socializing (Graham & Gosling, 2013). This highlights the need to consider many aspects such as players' motivations, learning preferences, and personalities in game design (Ferro, Walz, & Greuter, 2013). Studies in the related field emphasize the importance of considering the player types of learners in the process of preparing learning content (Krath, J., & von Korflesch, 2021).

Table 1. Player Types Formed by Different Researchers (Sezgin, 2020)

Bartle (1996)	Park Associate (2006)	Schuurman et al. (2008)	Fullerton (2008)
Achievers	Power gamers	Fanboys	Competitor
Socializers	Social gamers	Competers	Explorer
Explorers	Leisure gamers	The Escapist	Collector
Killers	Dormant gamers	Time Killers	Achiever
	Incidental gamers		Joker
	Occasional gamers		Artist
			Director
			Storyteller
			Performer
Gotzenbrucker & Kohl (2009)	**Drachen et al. (2009)**	**Nacke et al. (2011)**	**Xu et al. (2012)**
Communicative role-players	Veterans	Seeker	Achievers
Anarchists	Solvers	Survivor	Active buddies
Steady gamers	Pacifists	Daredevil	Social experience seekers
Designers	Runners	Mastermind	Team players
		Conqueror	Freeloaders
		Socialiser	
		Achiever	

Ferro et al. (2013)	Tondello et al.(2016)	Vahlo et al. (2017)	Sezgin (2020)
Dominants	Socializers	Mercenary	Completionists
Inquisitives	Free spirits	Companion	Socializers
Creatives	Achievers	Commander	Suicide Squad-Fiends
Objectivists	Philanthropists	Adventurer,	Pathfinders
Humanist	Players	Patterner	Collectors
	Disruptors	Daredevil	Belligerents
		Explorer	Explorers
			Deep-gamers
			Casual gamers

In this current study, Marczewski's (2015) player types Hexad Scale developed by Tondello et al. (2016) was used to determine the participants' player types. Marczewski (2015) classified players according to their intrinsic or extrinsic motivation and determined player types as achievers, players, socializers, philanthropists, disruptors, and free spirits. Players and disruptors have extrinsic motivation while playing games, while other player types have intrinsic motivation to play games. In-game personas belonging to the player types in Marczewski's (2015) classification of player types are briefly as follows.

Marczewski's (2015) Classification of Player Types

Marczewski's (2015) player types Hexad is a user typology model for thinking about different kinds of game players or users. It was developed by Andrzej Marczewski and consists of six player types:

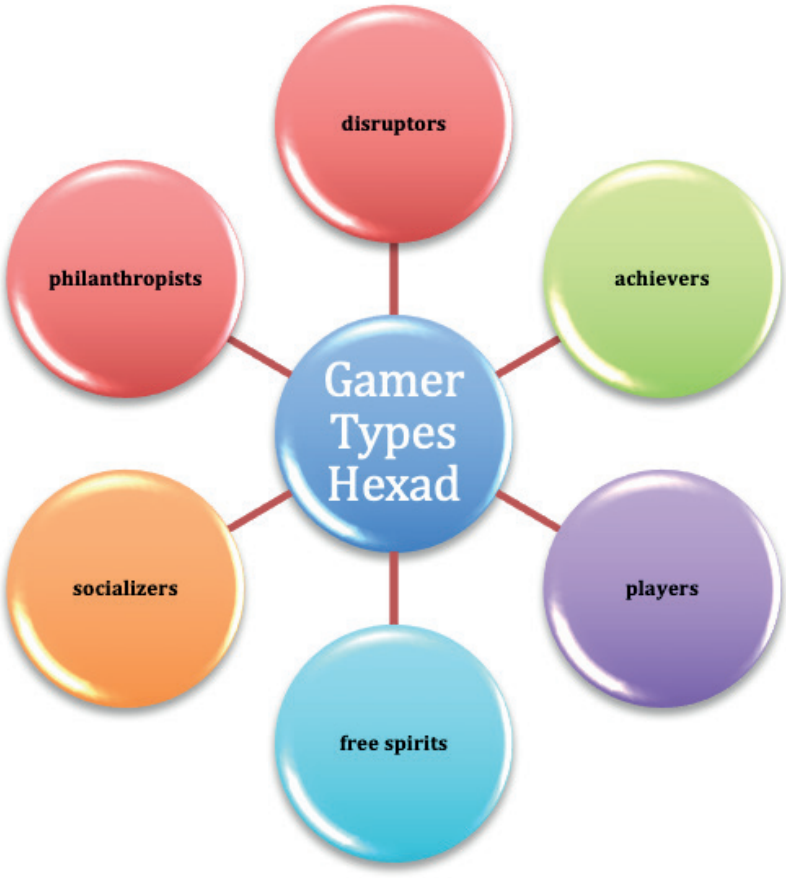

Figure 1. Marczewski's (2015) classification of gamer types

To summarise briefly, achievers are focused on winning. They want to acquire knowledge, learn new skills, and improve themselves. They are motivated by mastery. Socializers want to establish social communication with different players and build connections. They are motivated by relatedness. The source of motivation for socializer player types is socializing with other players in a gamified system. Free Spirits want to be independent, explore, and express themselves while playing games. They don't want to be externally controlled in gamified systems; they want to move freely. Philanthropists want to help other players without expecting any reward while playing games. They are motivated by purpose. Disruptors want positive or negative change in the game system by disrupting the system directly or through other players. Players have extrinsic motivation while playing games. They focus on getting rewards and earning badges in the game (Marczewski, 2015; Tondello et al., 2016).

Personality traits are an essential factor that can impact players' motivation to play a game and how they act within the game. Personality refers to distinctive qualities that shape how someone responds across various situations over their lifetime (Haizel et al., 2020). Overall, someone's personality can dictate their motivation for gameplay and their conduct in the game based on stable personality dispositions developed through biological programming or life experiences. This predisposition can also be expressed through cognitive processes caused by genetic or environmental factors. Robert and Mroczek (2008) define personality as relatively permanent traits of thoughts, feelings and behaviors that distinguish individuals from each other. Personality can also be considered as a whole that can change over time.

Personality can be seen as a dynamic construct that transforms over time. Research shows that personality traits are certainly not static, but rather continue to evolve throughout adulthood and later life (Roberts et al., 2017). Given the difficulties of accurately defining personality traits about age, different frameworks have been developed to classify personality traits. As approaches to personality development mature, it becomes imperative that models account for the potential variability of traits across the lifespan rather than relying on fixed assumptions. Describing personality as a holistic system subject to change rather than immutable traits would better reflect the complexity of human individuality. One prominent framework used widely for classifying personality factors is the five-factor model of personality (Costa & McCrae, 1992; Goldberg, 1992). This model suggests that human personality comprises five independent dimensions: openness to experience, neuroticism, agreeableness, extraversion, and conscientiousness. As personality continues to shift in adulthood, the five-factor rubric provides a means for conceptualizing key traits across different life stages.

Traits of the Five-Factor Model of Personality

Openness to Experience

People with high openness to experience as a personality trait are open to new concepts, perspectives, emotions, and encounters (Diener & Lucas, 2019; McCrae & Costa, 1997). Those who exhibit higher levels of openness have a strong curiosity, creativity, originality, and a tendency to defy convention while appreciating diversity. In contrast, individuals with low openness scores are generally less curious, reluctant to break out of their routines, and typically adopt more traditionalist mindsets (Costa & McCrae, 1992; Turhan & Tiftik, 2021). The openness factor indicates one's tendency to seek new horizons rather than remain limited to familiar areas, whether it is physically trying new activities or mentally exploring unfamiliar ideas. Higher levels of openness indicate more innovative thinking and diverse pursuits, while lower levels reveal conformity and narrower forms of behavior.

Neuroticism

Individuals with high levels of the personality trait neuroticism are inclined to more often undergo negative emotions like anxiety, anger, worry, and sadness (Blumer & Doring, 2012 ; McCrae & Costa, 1997). Those exhibiting heightened neuroticism tend to be tense, self-pitying, introverted, pessimistic, and emotionally unstable. Conversely, people on the lower end of neuroticism scores typically present as more composed, relaxed, level-headed, and self-content (Costa & McCrae, 1992; Lounsbury & Gibson, 2009). In essence, neuroticism regulates one's predisposition towards distressing affective states. This factor measures the

likelihood of feeling distressed or unstable rather than calm. Highly neurotic individuals are characterized by sadness, tension, and insecurity, while those with better emotional regulation emerge as calm, cool-headed, and confident.

Agreeableness

Individuals with these personality traits tend to be modest, compliant, friendly, and cooperative (McCrae & Costa, 1997). Agreeable individuals are compassionate, selfless, indulgent, and kind, while individuals with low agreeableness tend to be suspicious, asocial, egocentric, and rude (Blumer & Doring, 2012).

Conscientiousness

People with high levels of conscientiousness exhibit qualities such as organization, discipline, planning, rule adherence, and diligence in their work (Blumer & Doring, 2012; McCrae & Costa, 1997). Individuals scoring lower in conscientiousness are more often disorganized, careless, lacking direction, and acting impulsively on urges rather than considering consequences (Blumer & Doring, 2012; Costa & McCrae, 1992). In essence, this factor captures self-control and responsibility versus sloppiness and reckless spontaneity. While highly conscientious individuals demonstrate orderliness, focus, and hard work ethic, those with less developed conscientiousness tend to lack structured routines, follow-through, or deliberation over their choices.

Extraversion

Extraverted individuals like socializing and talking to others (McCrae & Costa, 1997). People who exhibit more extraversion are generally sociable, energetic, and socially interactive with others. In contrast, those with low extraversion tend to be reserved, quiet, and isolated from others (Blumer & Doring, 2012; Costa & McCrae, 1992). An individual may exhibit primarily one personality type or a mixture of more than one trait dimension. At its core, this factor captures social courage and dynamism as opposed to shyness and apathy. While highly extraverted people seek out the company and lively activities, the less extraverted are withdrawn into solitary spaces and interactions. However, personality consists of gradations across several spectra rather than categorical distinctions, so most exhibit some combination of traits. For example, an individual can be both open to new experiences and extraverted (Ferro et al., 2013).

LITERATURE REVIEW

Previous Research: Studies on Personality Traits, Digital Games and Player Types

In the literature, it is observed that various studies have been conducted on the potential relationship between digital game-playing behaviors and personality traits. These studies include personality traits and gaming behaviors (Graham & Gosling, 2013; Peever, Johson & Gardner, 2012), gaming disorder (Dieris-Hirche, 2020; Muhametjanova et al., 2021), gaming addiction (Muller et al., 2014), motivation and gaming disorder (Carlisle, 2019), online gaming (Charlton & Danforth, 2010; Mentese, 2017), digital game addiction (Kagizmanli, N., 2019; Mehroof & Griffiths, 2010) and game genres (Blocker, Wright & Boot, 2014; Braun et al., 2016; Yildiz, 2019).

Among these studies, Graham and Gosling's (2013) study examined the effect of personality traits on the interactions of those who play the multiplayer online role-playing game World of Warcraft, and concluded that personality traits are significantly effective in those interactions. In Ferro et al.'s study (2013), the findings indicated that behaviors in the virtual world are affected by personality traits.

In another study, Tondello et al. (2016) examined the behaviors of individuals both in the physical and virtual worlds, and according to the findings of the study, it was determined that the personality traits guiding both game behaviors were the same. Again, Haizel et al. (2021) found that the in-game behaviors of gamers who are deeply integrated with the game are likely to stem from their real-life personalities. However, in some studies, it has been stated that individuals, especially in Generation Z, develop a separate personality in the virtual world compared to Generations X and Y, as they grow up intertwined with technology and

spend more time in the virtual world than in the physical world (Dolot, 2018). Similarly, Utar and Yazici Yilmaz (2022) found that Generation Z students have different personality traits in the digital and physical worlds. These studies support the argument that "considering the personality traits of individuals when selecting game elements or designing digital/virtual as well as physical game-centered activities ensures that players are both intrinsically and extrinsically motivated" (Ferro et al., 2013). Because it is thought that game behaviors and personality traits are potentially highly associated.

These studies imply that accounting for players' conduct and personality qualities in digital gaming contexts may constitute a vital learning design consideration for game-based learning and gamification techniques. Numerous investigations with diverse samples have aimed to classify the personality traits and archetypes of video game players (Ferro et al., 2013; Tondello et al., 2016; Utar & Yazici Yilmaz, 2022). Synthesizing key findings across relevant research, certain personality factors and player motivations recur, allowing for generalized frameworks categorizing gamer dispositions and corresponding design tailoring. Essentially, patterns emerge such that understanding user personality and needs enables adaptation of game features to optimize engagement and outcomes. These player-centered insights can meaningfully inform creation of learning games and gamified systems.

Among these studies, Utar and Yazici Yilmaz (2022) examined the relationship between the player types and five-factor personality traits of Generation Z tourism students. These studies reveal connections between player typologies and personality traits. For instance, negative correlations emerged between certain player types and traits among Generation Z students (Utar & Yazici Yilmaz, 2022). Likewise, Ferro et al. (2013) demonstrated associations between personality categories and gamer types. Tondello et al. (2016) validated player classifications while showing five-factor model traits related to user archetypes. In summary, an individual's personality dimensions directly impact their player profile and priorities. Someone dispositionally anxious may favor support roles, while extraverts choose more social designs. These investigations collectively indicate that personality and play styles interrelate, so accounting for user temperament can optimize game-based learning. Matching gaming elements to participant traits may better engage them.

Although there are studies examining the relationship between personality traits and actor types, it is seen that the number of studies in the relevant literature is insufficient. In addition, in the studies conducted in the context of Turkiye, no study deals with player type and personality traits together in the sample of pre-service teachers. For this reason, it is thought that revealing the relationship between players' personality traits and gamification types will contribute to the literature in the contexts of educational game-based learning and gamification of teaching. In this study, it was aimed to examine the relationship between pre-service teachers' player types and five-factor personality traits. Within the scope of this purpose, answers to the following questions were sought:

1. What are the dominant player types of preservice teachers?
2. What are the five factor personality traits of preservice teachers?
3. Is there a significant relationship between preservice teachers' player types and personality traits?

METHODOLOGY

In this study, the dominant gamer/player types and five-factor personality traits of pre-service teachers were investigated. In addition, the relationship between these two variables was examined.

Participants

The sample of this study consists of 459 pre-service teachers studying in various disciplines at a state university in the Mediterranean Region of Turkiye in the Fall 2022 academic term. The study was conducted with pre-service teachers covering all departments to assess measures of personality and player types to assess interrelationships. This university-based sample allows research to be conducted among individuals preparing for future teaching roles. Table 2 summarises the key characteristics of the 459 participants.

Table 2. Characteristics of the Study Group

Gender	Frequency (f)	Percentage (%)
Woman	325	70.8
Man	134	29.2
Sum	459	100

As seen in Table 2, the participants consisted of 325 (70.8%) female and 134 (29.2%) male preservice teachers

Data Collection Tools

A two-part data collection tool was used to collect data online in this study. The first part of the data collection tool includes the Six Gamification Types Scale to determine the player types of preservice teachers. In the second part, the Five Factor Personality Scale was used to determine the personality traits of preservice teachers. Data were obtained from preservice teachers who voluntarily participated in the study during the fall semester of the 2022-2023 academic year.

The Gamification User Types Hexad Scale

"The Gamification User Types Hexad Scale" developed by Marczewski (2015), validated by Tondello et al. (2016), and adapted to Turkish by Akgun and Topal (2018) was used to determine the player types of the participants. The 7-point Likert-type scale consists of 6 factors and 24 items. The factors of the scale are "socializers", "free spirits", "achievers", "philanthropists", "players" and "disruptors". Each factor in the scale consists of 4 items. In their study, Akgun and Topal (2018) calculated Cronbach's Alpha reliability value for the whole scale as 0.89. The reliability coefficient values of the scale factors were found to vary between 0.71 and 0.80

The Five-Factor Model of Personality Test

The Five Factor Model measuring personality includes the dimensions of Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism, abbreviated "OCEAN" (John & Srivasta, 1999). This scale was adapted into Turkish by Unal (2015) and used here to evaluate participant traits. The 44-item tool utilizes a 5-point Likert scale across the five factors representing distinct traits – Extraversion (8 questions), Agreeableness (9 questions), Neuroticism (8 questions), Openness to Experience (10 questions), and Conscientiousness (9 questions). Past analysis by Unal (2015) found sub-dimension Cronbach's alpha reliability scores ranging from 0.62 to 0.87. Mean totals derive from participant responses to corresponding items – Openness to Experience (5, 10, 15, 20, 25, 30, 35R, 40, 41R, 44), Conscientiousness (3, 8R, 13, 18R, 23R, 28, 33, 38, 43R), Extraversion (1, 6R, 11, 16, 21R, 26, 31R, 36), Agreeableness (2R, 7, 12R, 17, 22, 27R, 32, 37R, 42), and Neuroticism (4, 9R, 14, 19, 24R, 29, 34R, 39). Here "R" indicates reverse scoring for scale items.

Data Reliability

To assess the internal consistency of the items measuring the different user types, the Gamification User Types Hexad Scale was subjected to a Cronbach's alpha reliability test. As shown in Table 1, the analysis yielded a Cronbach's alpha coefficient of $\alpha = 0.85$, suggesting a high level of internal consistency among the scale items. In essence, this means that the items within the scale uniformly measure the diversity of user engagement types in gamified systems. In a similar manner, The Five-Factor Model of Personality test was checked for its internal consistency. The computed Cronbach's alpha for this scale was $\alpha = 0.87$, suggesting that the items from the scale measuring the five broad domains of personality have a strong internal consistency, thus validity of the scale in measuring these personality dimensions.

Data Analysis

The data were subjected to descriptive statistical analyses and correlation tests. Initial analyses confirmed normal distributions among the variables according to the Kolmogorov-Smirnov test, skewness and kurtosis measures, and stem and leaf plots. Kolmogorov-Smirnov significance levels exceeded 0.05, while skewness and kurtosis remained between -2 and +2, confirming normality for the dataset (n=459). The fulfilment of normality assumptions forms the basis for meaningful parametric tests. Accordingly, the subsequent investigation of the personality and player type measures included correlational methods to show central tendencies that reflect overall trends and relationships between the dimensions.

Descriptive statistics were used to determine the dominant gamification/gamer types and personality traits of the participants. Dominant gamification types were determined to be the trait with the highest score. Participants who received the same score for more than one trait were considered to be equally dominant in these traits. In addition, the frequency of each dominant personality trait was calculated. This was done to determine which personality trait was most common among the participants. Pearson correlation tested connections between personality traits and player types given meeting parametric assumptions. Pearson correlations quantify linear relationships' directionality and magnitude between continuous variables (Tabachnick & Fidell, 2015). Applying this method here reveals pairwise alignments across the five personality dimensions represented on the 44-item scale and user archetypes based on gaming motivations. The resulting correlation matrix indicates any personality factor's positive or negative prediction of a particular player typology using Pearson r values from -1 to +1. Values nearing ±1 denote strong relationships, while values approaching 0 reflect weak or negligible relationships. The correlation coefficients obtained (minus or plus) indicate the direction of the potential relationship, while the absolute value indicates the strength of the relationship.

FINDINGS

This study investigated six different types of gamers (Philanthropist, Socializer, Free Spirit, Achievers, Disruptors, Players), personality traits (Openness to Experience, Conscientiousness, Extraversion, Agreeableness, Neuroticism), and the relationship between these two variables in a sample of pre-service teachers studying at the undergraduate level. In this section, research findings are presented under three headings in line with the research questions.

Findings on Player Types

Within the scope of the first research question, the dominant player/ gamer types of the participants (n=459) were examined. While some participants displayed a clearly defined player type, others exhibited hybrid profiles with multiple motivations. Among those showing one dominant gamer/player type, achievers (n=87), disruptors (n=80), and socializers (n=69) emerged as most prevalent, together comprising almost two-thirds of the sample. These types were followed by achievers, philanthropists and free spirits.

Table 3. Characteristics of the Study Group

Dominant Gamer Types	Count
Player	87
Disruptor	80
Socializer	69
Achiever	49
Philanthropist	47
FreeSpirit	22
Socializer, Achiever	18
Disruptor, Player	13
Philanthropist, Socializer, Free Spirit, Achiever, Disruptor, Player	9
Philanthropist, Socializer	8
Philanthropist, Socializer, Achiever	5
Philanthropist, Achiever	5
FreeSpirit, Achiever	4
Philantropist, Disruptor	4
Socializer, Achiever, Disruptor, Player	4
Socializer, Disruptor, Player	4
Socializer, Achiever, Disruptor	3
Philanthropist, Player	3
Socializer, FreeSpirit, Achiever	3
FreeSpirit, Player	3
Socializer, FreeSpirit	3
FreeSpirit, Disruptor, Player	2
Socializer, Disruptor	2
Philanthropist, Socializer, Achiever, Disruptor	2
Achiever, Disruptor	2
Socializer, Player	2
Philanthropist, FreeSpirit, Achiever, Disruptor	1
Philanthropist, Socializer, Achiever, Disruptor, Player	1
Achiever, Disruptor, Player	1
Socializer, FreeSpirit, Player	1
Socializer, Achiever, Player	1
Philanthropist, Achiever, Player	1

As mentioned above, some players may have more than one dominant player type. When the combined player profiles with more than one player type are examined, it is seen that 18 of the participants have both the "Socializer" and the "Achievers" type. These two types together are more common than others. Some player combinations are very rare. For example, there is only 1 person with the combination "Philanthropist, Socializer, Achievers, Disruptor, Player". The most complex combination of gamer types is "Philanthropist, Socializer, Free Spirited, Achievers, Disruptors, Gamers" which has 6 different types and there are 9 people with this combination. This shows that players can sometimes have more than one motivation, and these motivations can combine to form complex player profiles. Disruptor and Player types are also often seen together. This suggests that more competitive and active gaming styles may coexist. What is noteworthy in this table is that, contrary to expectations (reference), 354 out of 459 participants (77.12%) were of a single dominant player type.

Table 4. The Most Common Player Types When Considering Combined Player Types

Dominant Gamer Types	Count
Socializer	134
Player	129
Disruptor	126
Achiever	95
Philanthropist	85
FreeSpirit	41

When the combined player types and single dominant player types are examined together, the most common player types identified are socializer, player, and disruptor player types as seen in Table 4. The least observed player type is free spirit. It is also observed that the socializer player type, which ranks 3rd among the dominant player profiles in Table 3, ranks 1st in Table 4 in the overall distribution. When these findings are evaluated together with Table 3, it is evident that the need for socialization is the most influential component of the participants' motivation to play.

Findings on Personality Traits

However, people often display multiple personality traits rather than just one dominant quality, similar to having blended gaming motivations. An individual's "leading" trait simply supersedes other aspects in their profile, which still hold some influence. In other words, even someone high in conscientiousness shows some degree of other attributes, just to a lesser extent. For instance, an exceptionally extraverted person likely possesses some neurotic and agreeable dimensions as well, despite extraversion serving as their defining trait overall. So subjects here exhibit a primary personality orientation amid a composite of qualities integrated in variable degrees. One factor may predominate but secondary traits contribute to multidimensional profiles rather than singular categories.

Table 5. Characteristics of the Study Group

Dominant Trait(s)	Count
Openness	183
Conscientiousness	102
Agreeableness	81
Neuroticism	51
Extraversion	22
Conscientiousness, Agreeableness	7
Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism	6
Extraversion, Neuroticism	2
Openness, Extraversion	2
Agreeableness, Neuroticism	1
Conscientiousness, Extraversion	1
Openness, Extraversion, Agreeableness	1

These results show that "Openness to experience" is the most common dominant personality trait among the participants. For about one-third of the sample, the Openness to experience personality trait is prominent. This indicates that creative and curious individuals who are open to new experiences and ideas are quite common in the sample. The second most common personality trait in the sample is "conscientiousness". This demonstrates that organized, responsible, and self-disciplined individuals are common among pre-service teachers. On the other hand, "Extraversion" is the least common personality trait. In very few participants (n=6), 5 personality traits were dominant at the same time. This is a very rare and complex personality profile. In general, the prominence of Openness may indicate the creative and curious nature of the sample of this study. Other combined personality traits are rarer and are usually represented by 1 or 2 individuals in the sample.

Table 6. The Most Common Personality Types When Combined Player Types Are Considered

Dominant Gamer Types	Count
Openness	192
Conscientiousness	116
Agreeableness	96
Neuroticism	60
Extraversion	34

When participants who exhibited more than one personality trait were evaluated together with those who exhibited a single trait, "openness to experience" (n=192), "conscientiousness" (n=116), and "agreeableness" (n=96) emerged as the most common personality traits. On the other hand, in both single and multiple-trait groups, "extraversion" stood out as the least common personality trait among the participants. Thus, openness, conscientiousness, and agreeableness are quite dominant in the sample, while extraversion is less common.

The Relationship between Participants' Personality Traits and Player Types

The results of the Pearson correlation analysis to examine the potential relationship between dominant personality traits and dominant player types among the participants (n=459) are presented in Table 7.

Table 7. Pearson Correlation Coefficients Between Participants' Dominant Personality Traits and Dominant Player Types

	Philanthropist	Socializer	Free Spirit	Achiever	Disruptor	Player
Openness	0.534	0.475	0.244	0.481	0.320	0.365
Conscientiousness	0.255	0.248	–0.253	0.338	–0.187	0.089
Extraversion	0.510	0.320	–0.147	0.438	0.060	0.090
Agreeableness	0.101	0.128	0.160	0.105	0.200	0.398
Neuroticism	0.279	0.147	0.166	0.162	0.410	0.304

Correlations significant at 0.01 level of significance

Philanthropist

When the relationship between philanthropist player type and personality traits is examined, it is found that this player type exhibits moderate positive relationships with openness to experience and extraversion and low positive relationships with conscientiousness and neuroticism. The moderate relationship with openness to experience can be explained by the fact that philanthropists are open to innovations and different experiences. The relationship with extraversion is also in line with the social and energetic nature of this player type. The low correlation with the personality trait of agreeableness can be interpreted as individuals of this gamer type are not very committed to certain rules and regulations. The low positive correlation with neuroticism may also reflect their tendency to experience emotional ups and downs. As a result, the personality structure of the philanthropist player type suggests an innovative, social, emotional and more or less rule-less profile.

Socializer

The socializer player type has moderate correlations with the traits of openness, conscientiousness, extraversion, agreeableness, and neuroticism. It has higher correlations especially with openness to experience and extraversion. Since individuals with high openness to experience personality traits are curious, creative, and diversity-seeking, socializers can be expected to exhibit similar characteristics. Likewise, extraverted

individuals who like to be socialized overlap with the socializer player type who values social interaction. The moderate level of agreeableness can also be explained by the socializers' harmonious and friendly nature within the group. The relationship with neuroticism may indicate that this player type may experience emotional ups and downs. The lower correlation with the trait of responsibility may indicate that socializers have a more flexible structure that attaches less importance to rules and discipline. In summary, the personality traits profile of the socializer player type is consistent with their group-oriented, social, emotional, and curious nature.

Free Spirit

Individuals with high openness to experience are curious and diversity-seeking, which coincides with free spirits being in search of discovery and adventure. Also, the extraversion relationship may reflect their sociable side to some extent. However, the negative association with conscientiousness is compatible with the more free and independent nature of free spirits, who do not attach much importance to rules and discipline. The relationship with agreeableness may also indicate the importance they attach to their autonomy. To summarise this information, it can be stated that the personality trait profile of the free-spirited player type reflects a characteristic profile of a free-spirited person who is seeking adventure and discovery and who is free from rules and responsibilities.

Achiever

When the relationship between the achiever player type and different personality traits was analyzed, it was determined that this player type has a high-level relationship with openness to experience and a medium-level relationship with conscientiousness, extraversion, and neuroticism. Individuals with high openness to experience are curious and open to innovations. This coincides with the structure of achiever individuals who seek new challenges and like to explore, and the relationship with conscientiousness personality type matches with their motivated structure towards achieving certain goals. In addition, the extraversion relationship may reflect their ability to interact with the group. Also, the moderate level of correlation between achiever player type and neuroticism personality trait may be a result of the stress they may experience related to their desire to achieve. In general, the personality traits profile of the achiever is consistent with a competitive structure that is open to innovation and exploration and focused on achieving specific goals.

Disruptor

When the relationship between the disruptor player type and the personality traits was analyzed, it was observed that this player type exhibited a low correlation with openness to experience, conscientiousness, and agreeableness, and a medium correlation with neuroticism. The low relationship with openness to experience may indicate that disruptors are only partially open to new experiences and ideas, and the low relationship with conscientiousness may indicate that they do not attach importance to rules and order at a partial level. The weak correlation with the agreeableness personality trait reflects the idea that such players do not tend to make efforts to get along with others. Furthermore, the moderate correlation with neuroticism may reflect the tendency of disruptors to experience negative emotional states such as stress, anxiety and anger. In summary, the personality traits profile of disruptors seems to be consistent with a structure that is indecisive about following rules, may not behave harmoniously, and experiences emotional ups and downs.

Player

A weak correlation was found between the "player" type and the personality trait of openness to experience. This suggests that "players" are generally not very open to new experiences and concepts. The low to moderate correlation with neuroticism and the moderate correlation with conscientiousness suggest that "players" may experience emotional imbalance and at the same time often adhere to structures and schedules. In sum, "players" seem to resist unfamiliar experiences and aim to follow regular schedules, although they may be troubled by emotional mood.

Pearson correlation analysis was performed to examine the relationships between the personality traits of the participants and player types. The results in Table 7 show that there are mostly moderate (0.3-0.5) statistically significant correlations between player types and personality traits at the 0.01 level. The strongest links are between openness to experience and extraversion for philanthropists; openness to experience and extraversion for achievers; and openness to experience and extraversion for achievers player types. This suggests that there are consistent relationships between specific player types and traits. However, correlation analysis only shows the relationship between variables. In other words, a high level of correlation between a player type and a personality trait does not mean that one is the cause of the other; it only indicates a potential relationship.

DISCUSSIONS AND CONCLUSION

Personality Traits

This study aimed to determine the dominant personality traits, dominant player types and personality traits-player types relationships of the participants. When the research findings related to dominant personality traits were analysed, it was found that openness to experience was the most dominant personality trait. This result suggests that the participants consisting of pre-service teachers are open to new experiences and ideas. In addition, it was found that conscientiousness, agreeableness, and neuroticism personality traits followed openness to experience in frequency. However, extraversion personality trait was found to be the least common personality trait among the participants. According to this finding, extraverted personality trait is the least common trait among the pre-service teachers participating in the study. Individuals with high extraverted personality traits are more sociable and interactive than individuals with low extraverted personality traits. However, in this study, this trait was found to be less common among pre-service teachers. This indicates that pre-service teachers are generally more reserved, introverted and prefer to remain silent. From the perspective of teaching profession, this result is remarkable considering that being extraverted is an important characteristic for effective communication with students.

Previous studies on personality traits have revealed different findings. In a study conducted by Erol et al. (2021) on pre-service teachers, it was found that the most common trait was agreeableness, followed by openness, conscientiousness, and extraversion. Neuroticism was found to be the least common personality trait. A separate study conducted by Yigit and Seferoglu (2019) on university students revealed a similar result. Agreeableness was again the most common personality trait, followed by openness, conscientiousness, extraversion and finally neuroticism. Thus, both studies identified agreeableness as the primary trait and neuroticism as the least exhibited trait in their samples. This suggests that there is a consistency in the personality traits of agreeableness and neuroticism, especially among higher education student populations.

In the study conducted by Utar and Yazici Yilmaz (2022), the research sample consisted of tourism faculty students and it was observed that conscientiousness was the most dominant personality trait. Extraversion, agreeableness and neuroticism personality traits were found to follow responsibility personality trait respectively. In addition, it was concluded that openness to experience was the least common personality trait. A separate study conducted by Bolek and Coskun Senturk (2024) on music teacher candidates, it was found that the most common personality trait was openness, followed by agreeableness, conscientiousness, extraversion and neuroticism.

These similarities or differences reflect the potential of different sample groups to influence the research results.

Player/Gamer Types

Analysis of player/gamer types in this sample reveals several prevalent categories. When examining participants with a single dominant gaming style, the Player, Disruptor, and Socializer types emerge as most common. The Player style, exhibited by 87 participants, points to motivation fueled by action, excitement, and reward-seeking. The Disruptor style, seen in 80 participants, indicates a drive for testing boundaries and causing mischief. And the Socializer style, present in 69 participants, shows a priority on connecting with

others. Achievers, Philanthropists, and Freespirits were less common as singular dominant gaming types in this sample. However, when accounting for both single types and combined types, the Socializer, Player, and Disruptor still make up the majority. This demonstrates that rewards, disruption, and social connections shape gaming motivations for much of this population, whether as a primary standalone drive or in tandem with other motivations.

The results of this study offer an interesting perspective when compared to findings from previous research. Firstly, Tondello et al.'s (2019) study among adults and Santos et al.'s (2021) study among almost all age groups starting from 10 years old confirmed that Philanthropist, Free Spirit, and Achiever are the most common gamification user types. In addition to these studies, the study conducted by Lopez and Tucker (2019) on university students revealed that Free Spirit, Philanthropist, and Achiever are the most common user types. Again, Senocak et al. (2019) conducted a study on adult learners in a distance education system and found that Philanthropist, Free Spirit and Achiever user types are the most common user types in the gamification process. In summary, it shows that these three player types are dominant in the general adult learner population and confirms the findings of this study.

On the other hand, there are also studies with different findings. In the study of Utar and Yazici Yilmaz (2022), it was determined that Disruptor, Player, and Free Spirit player types were the most dominant player types among tourism students. In the study conducted by Tondello et al. (2019) among adult learners (>18), it was found that player types varied depending on age and gender variables. These two variables are the only two parameters that can be seen in different samples. Therefore, if player types as individual differences are to be used in an instructional design, the structure of the sample should be evaluated together with previous similar samples. On the other hand, Marczewski (2020) showed that the philanthropist player type was the most common player type. Likewise, this finding is in parallel with the findings of the present study.

The above research shows that similar results on the distribution of gamification user types have been obtained in different studies, while some studies have produced slightly different but parallel results. The reason for these differences can be seen as the nature of the sample (age group, gender, socio-economic level, occupation, etc.). Therefore, it seems important for researchers and designers who want to develop personalized processes in the context of gamification design to conduct further research to better understand the reasons underlying these different results. In particular, in addition to the scales in which users indicate their game behaviors, in-depth analyses such as observation of players' actual behaviors in the game environment can be said to be necessary for the individualization of gamification.

Relationship between Personality Traits and Player/Gamer Types

There are a limited number of studies examining the relationship between personality traits and player types. Firstly, Utar, Yazici, and Yilmaz (2022) examined the relationships between different player types and personality traits. The findings show that there are positive and negative relationships between some player types and certain personality traits. For example, achieving and agreeable personality traits show a positive relationship with certain player types, while extraverted and helpful personality traits show a negative relationship.

In Tondello et al.'s (2016) study, only certain relationships between player types and personality traits were emphasized and some of the relationships were not statistically significant. In particular, no significant relationship was found between player types and extraversion and conscientiousness personality traits. The results from these studies highlight the complex links between game/player types and personality traits and suggest that additional variables (game type, age, gender, or other demographic factors, etc.) may influence these relationships. Therefore, further research is needed to gain a more robust understanding of how these variables interact.

Analyses of correlations between personality traits and player types reveal noteworthy relationships that contribute to explaining motivations and tendencies in this present study. The Pearson correlation analysis revealed several notable relationships between personality traits and player types. Moderate to high positive correlations emerged between Openness and the Philanthropist, Socializer, Free Spirit, Achiever, and Player types, suggesting these types are more common among creative, imaginative people open to experiences.

Additionally, positive correlations were found between Extraversion and the Philanthropist, Achiever, and Disruptor types, indicating these types are associated more with highly sociable, sensation-seeking individuals. Conscientiousness only correlated positively with Achievers, aligning with their achievement drive. Neuroticism correlated with Disruptors and Players, reflecting impulsive tendencies. The strongest correlations were between Openness and Philanthropist; Openness and Achiever, and Extraversion and Achiever, underscoring imagination, curiosity, and sociability as key Achiever motivations.

Furthermore, these correlations shed light on how innate personality differences may shape gaming motivations and styles. For instance, the Player type's association with Agreeableness and Neuroticism points to collaborative and competitive aspects in these players. The relationships between the Philanthropist type and Openness, Conscientiousness, Extraversion, and Neuroticism suggest drives around purpose, meaning and social connections. Overall, personality traits appear to relate to and possibly influence player type formation and gaming approaches. Unpacking these relationships offers insight into the psychological forces underlying different player motivations and preferences. These correlations

This research has shed light on the connections between gamer personalities and motivations by looking at how personality traits relate to player types. It found some of the most common player types are Philanthropists, Achievers, and Free Spirits. However, the prevalence of certain types can shift across different studies. Additionally, complex relationships seem to exist between personality factors and player tendencies. For example, those exhibiting a Philanthropist play style typically display qualities of open-mindedness, organization, sociability, and some anxiety. In contrast, Player-type gamers tend to show traits of cooperation and nervousness. These interplays between personalities and gaming motivations can significantly impact game design elements, user engagement, and marketing plans that tap into gamer psychographics. Also, these relationships could be impactful across areas like game design, user experience, and marketing strategies.

In addition to outlining notable correlations between certain gamer types and personality qualities, suggesting some player profiles relate more broadly to personality factors, this study also highlights a lack of significant correlations for other types. This implies personality may play a less integral role among these gamer types. For instance, the negative association between Free Spirits and Conscientiousness aligns with this player type's carefree nature. However, fully grasping the impact of personality traits in shaping player tendencies requires further investigation. Examining the precise interplays between personality markers, player preferences, and gaming approaches is key for effective gamification design and application. In essence, by uncovering these overlays between personalities and player profiles, this research provides useful insights for customizing game mechanics, experiences, and outreach to resonate better with target groups.

Moreover, emerging research interests involve leveraging player-type models to personalize gamified systems and boost individual motivation and performance. Many current gamified platforms presume users constitute a homogeneous block, responding uniformly to game components. However, studies indicate reactions to gamification differ based on individual differences. Elements motivating one user may not affect another similarly. Due to such limitations of existing platforms, researchers are now exploring how diverse player types perceive and interact with gamified systems. However, consensus persists around the need for more empirical inquiries given the narrow understanding of player-type models and their potential for advancing gamification. Most current studies have focused on correlations between player types and individual perceptions of game features without exposing them to these features in a practical application or analyzing their performance in a platform implementing those elements. In essence, while this research has revealed some initial interplays between personality traits and player profiles, designing truly personalized, optimized gamification systems will require a much deeper investigation into these relationships as well as application in real-world contexts.

However, more work is still required for these relationships to be better understood.

Specific areas needing additional focus include:

- Sample sizes should be assessed for adequacy and representativeness, with studies replicated on larger samples
- More research is required on causality - whether personality determines player type or vice versa remains unknown

- Individual differences in player type combinations and preferences suggest personalized gamification strategies may be impactful
- Interactions between player types, personalities, and gamification experiences warrant additional empirical research to determine impacts on motivation and performance

In a nutshell, this research makes important contributions to gamification studies and lays a foundation for additional research. Increased insight into gamification users' personality traits and player motivations can inform more successful game and user experience design methodologies. However, the complex links between these factors reveal the need for ongoing research to develop a more precise conceptualization of how they are interrelated. While these findings contribute to the emerging understanding of the gamification field, additional research in a variety of contexts will be a complementary element of using this knowledge for better practical application development.

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