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|Research Article / Araştırma Makalesi|

An Examination of Middle School Students' Digital Game Addiction and School Engagement Levels Based on the Variable of Participation in School Sports

Ortaokul Öğrencilerinin Dijital Oyun Bağımlılığı ve Okula Bağlılık Düzeylerinin Okul Sporlarına Katılım Değişkeni Bakımından İncelenmesi

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Keywords

Digital game addiction

School engagement

School sports

Abstract

The purpose of this study is to examine the levels of digital game addiction and school engagement of middle school students in terms of participation in school sports. The descriptive survey model was used in the study. The population consisted of middle school students aged 10–14 studying in the city center of Kastamonu province during the 2024–2025 academic year. Due to the difficulty of reaching the entire population, purposive and convenience sampling methods were used together. Data were collected using the Personal Information Form, the Digital Game Addiction Scale for Children (DGAC) developed by Hazar and Hazar (2017), and the School Engagement Scale (SES) developed by Fredricks et al. (2005) and adapted into Turkish by Çengel et al. (2017). The data were analyzed using SPSS 26.0 software. The findings revealed that students participating in school sports scored significantly lower on all subdimensions of the DGAC compared to those who did not participate. In contrast, non-participating students demonstrated higher levels of school engagement compared to student-athletes. Regarding gender, female students scored lower than male students in digital game addiction, while differences in school engagement were limited to certain subdimensions. In terms of grade level, 8th-grade students had the lowest mean scores on both scales. Furthermore, a positive and statistically significant relationship was found between all subdimensions of school engagement and digital game addiction. These findings suggest that sports participation may reduce time spent on digital games by promoting healthier and more structured use of leisure time. It can be suggested that the gains provided by sport play a regulatory role in students' gaming behavior. However, in terms of school engagement, it was determined that students who did not participate in school sports had significantly higher levels of engagement. This situation may be explained by the possibility that the athletic identity of student-athletes takes precedence over their student identity.

Anahtar Sözcükler

Dijital oyun bağımlılığı

Okula bağlılık

Okul sporları

Öz

Bu çalışmanın amacı, ortaokul öğrencilerinin dijital oyun bağımlılığı ve okul bağlılığı düzeylerini, okul sporlarına katılım değişkeni açısından incelemektir. Araştırmada betimsel tarama modeli kullanılmıştır. Araştırmanın evrenini, 2024–2025 eğitim-öğretim yılında Kastamonu il merkezinde öğrenim gören 10–14 yaş arası ortaokul öğrencileri oluşturmaktadır. Evrenin tamamına ulaşmanın güç olması nedeniyle amaçlı örnekleme ve kolayda örnekleme yöntemleri birlikte kullanılmıştır. Veri toplama aracı olarak Kişisel Bilgi Formu, Hazar ve Hazar (2017) tarafından geliştirilen Çocuklar İçin Dijital Oyun Bağımlılığı Ölçeği (DGAC) ile Fredricks vd. (2005) tarafından geliştirilen ve Çengel vd. (2017) tarafından Türkçeye uyarlanan Okul Bağlılığı Ölçeği (SES) kullanılmıştır. Veriler SPSS 26.0 programı ile analiz edilmiştir. Araştırma bulguları, okul sporlarına katılan öğrencilerin Dijital Oyun Bağımlılığı Ölçeği'nin tüm alt boyutlarında, katılmayan öğrencilere göre anlamlı düzeyde daha düşük puanlar aldığını göstermiştir. Buna karşılık, okul sporlarına katılmayan öğrencilerin okul bağlılığı düzeylerinin, spor yapan öğrencilere göre daha yüksek olduğu belirlenmiştir. Cinsiyet değişkenine göre yapılan analizlerde, kız öğrencilerin dijital oyun bağımlılığı düzeylerinin erkek öğrencilere göre daha düşük olduğu; okul bağlılığı açısından ise farklılıkların yalnızca bazı alt boyutlarla sınırlı olduğu ortaya konmuştur. Sınıf düzeyine göre yapılan değerlendirmelerde ise 8. sınıf öğrencilerinin her iki ölçekte de en düşük ortalama puanlara sahip olduğu tespit edilmiştir. Ayrıca, okul bağlılığının tüm alt boyutları ile dijital oyun bağımlılığı arasında pozitif ve istatistiksel olarak anlamlı ilişkiler bulunmuştur. Bu bulgular, spor etkinliklerinin öğrencilerin boş zamanlarını daha sağlıklı ve yapılandırılmış bir şekilde değerlendirmelerine olanak tanıyarak dijital oyunlara ayrılan süreyi azaltabileceğini göstermektedir. Bu bağlamda, sporun öğrenci davranışlarını düzenleyici bir rol üstlenebileceği söylenebilir. Bununla birlikte, okul bağlılığı açısından değerlendirildiğinde, okul sporlarına katılmayan öğrencilerin bağlılık düzeylerinin spor yapan öğrencilere göre anlamlı düzeyde daha yüksek olduğu belirlenmiştir. Bu durumun, öğrenci sporcuların sporcu kimliklerinin öğrenci kimliklerinin önüne geçmesiyle ilişkili olabileceği düşünülmektedir.

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Introduction

Notable alterations have been detected in children's engagement in physical activities and sports in recent years. In the past, children met their physical activity needs through unstructured outdoor play, while today, this need is increasingly met through organized and structured activities, courses, or club-based programs under professional supervision (Gray, 2011). It might be claimed that parental protective attitudes, worries about safety that come with living in a city, and the change from conventional play modes to digital platforms have all had a role in this change. Empirical research supports this view, indicating that parental safety concerns significantly restrict children's independent outdoor play, while increased engagement with digital media is associated with reduced physical activity levels (Valentine & McKendrick, 1997; Tremblay et al., 2011).

These days, kids meet their fitness and sports needs more often in supervised and regulated environments than by playing outside like they used to (Dapp et al., 2021). In this instance, school sports are very important since they give kids a safe, easy, and pleasant way to do exercise. Students can play sports at school with their friends, and professors or coaches will be watching over them. Most of the time, it's free. This fulfills a fundamental requirement for physical development and social engagement. Trudeau and Shephard (2008) asserted that heightened participation in school-based physical activities correlates with a substantial enhancement in overall physical fitness. Öcal and Koçak (2010) found in their study that kids who played sports at school were better at socializing, being responsible, controlling their emotions, and learning about other cultures than kids who didn't play sports. In this context, it may be said that schools significantly enhance children's social, emotional, and cultural development by providing organized conditions for physical activity (Singh et al., 2012). We need to look at both physical education classes and sports activities outside of school at the same time to get a comprehensive picture of how school sports work.

Physical Education Classes and Extracurricular Sports Activities Conducted in Schools

The improvement of physical education in Türkiye means that the government is changing its perspective on young people and public health. When the Republic of Türkiye was established and the concept of physical education was introduced the process that had begun in the late Ottoman period with military discipline and strength-based gymnastics routines became essential in schools and gained further importance during the Atatürk era as it was believed that sport contributed to children's physical, cognitive, and moral development (Günay, 2013). Physical education curricula have evolved from a militaristic focus on discipline to a more comprehensive educational framework and since the 2000s they have been restructured to develop not only psychomotor skills but also cognitive awareness, healthy living habits, and values (Özçakır, 2015)

In Türkiye, physical education is implemented as a compulsory subject in middle school as an integral part of the formal education system. The Physical Education, Games, and Sports Curriculum developed within the framework of the Türkiye Century Education Model integrates students' basic motor skills, rhythmic movements, and the culture of games and sports while promoting positive attitudes toward physical activity, encouraging active lifestyles, enhancing social-emotional competencies, and supporting participation in elective and extracurricular sports aligned with students' interests and abilities (Ministry of National Education, 2025). Students might choose to take elective classes that focus on subjects that interest them and those they are good at. This paradigm promotes autonomous student engagement in sports, enhancing their intrinsic motivation (Aydın et al., 2022). School sports are not the same as other activities outside of school.

Physical education used to be only about how well you did in sports, but now it's a branch of study that encompasses many other things. The Türkiye Century Education Model, which started in 2024, has made this change clearer and more organized. The idea is centered on the student and has a broad and open-minded view of education. According to the Ministry of National Education (2025), physical education is not only a means of promoting physical activity but also a strategic field that supports students' social, emotional, cultural, and cognitive development, emphasizing an inclusive and student-centered approach in contrast to the traditional system in which children were generally regarded as passive participants. The Türkiye Century

Education Model aims to ensure the inclusion of all children by addressing their individual needs, making physical education sessions more accessible, diversifying learning environments for different physical ability levels, encouraging boys and girls to participate in sports together, and increasing accessibility for children with special needs (Nakip, 2024)

The Historical Development of School Sports and Their Current Status in the Curriculum

In Türkiye during the early Republican period, schools emphasized physical education based on the premise that sports may help kids grow physically, cognitively, and morally (Pehlivan, 2004). Today, this historical route has become an institutional framework since the Ministry of National Education and the Ministry of Youth and Sports worked together. School sports activities are conducted under the coordination of the General Directorate of Sports Services of the Ministry of Youth and Sports, and a national competition calendar is announced at the beginning of each academic year (Ministry of Youth and Sports, 2025a).

In Türkiye, school sports activities are conducted under the coordination of the General Directorate of Sports Services of the Ministry of Youth and Sports, and sports branches and age categories are officially determined for each academic year. When examining the "Sports Branch, Age, and Category Table" published for the 2025–2026 academic year, it is observed that school sports have a multi-branch and tiered structure. Accordingly, the activities include a wide range of individual and team sports such as athletics, basketball, volleyball, football, handball, badminton, table tennis, judo, wrestling, tennis, swimming, hockey, archery, karate, taekwondo, modern pentathlon, folk dances, and similar sports. Students are categorized according to their ages. At the middle school level, kids compete in sports based on their birth year and the sport they play. This strategy makes sure that kids compete in conditions that are good for their growth and development and lets sports activities happen based on teaching methods. Also, the fact that some sports have divisions for impaired athletes shows that school sports are meant to include everyone (Ministry of Youth and Sports, 2025b).

This institutional framework shows that school sports are more than just competitions; they also offer a systematic, step-by-step, and curriculum-integrated sports model (Fakazlı & İlhan, 2023). Sports teams in school help pupils put what they learn in class into practice in the real world. For instance, they educate kids how to be responsible, work together, make plans, and obey regulations in a real-world context (Bailey, 2006). From this point of view, school sports may be seen as a way to improve the performance, social learning, and values education parts of physical education within the current educational system (Pehlivan, 1998; Tan, 2021; Turan, 2020).

The Educational Function and Theoretical Positioning of School Sports

School athletics are more than just a way to get some exercise. They represent a systematic, learning-oriented approach that provides students with structured practice opportunities in schools, supports multidimensional learning outcomes, and is examined in international literature across various subcategories such as physical education classes, school teams, club activities, and extracurricular sports events (Bailey, 2006; Trudeau & Shephard, 2008). In this context, physical education and sports classes are integrated as either compulsory or elective components of the formal curriculum, whereas school teams and extracurricular sports activities are regarded as voluntary endeavors, characterized by either a performance-oriented or recreational focus (Marsh & Kleitman, 2002). The literature delineates this structure via formal and informal modalities of sports participation (Coalter, 2013). The formal dimension encompasses in-class activities integrated into the curriculum, characterized by distinct pedagogical objectives and established assessment protocols. In contrast, the informal dimension comprises sports organizations linked to school identity and social belonging, in which students participate voluntarily (Eccles & Barber, 1999). As all sports organizations were cancelled during the Covid-19 pandemic (Seçer et al., 2025), school sports activities in Türkiye were also suspended following the official directive on the cancellation of social activities issued in March 2020 and were later reintroduced with the implementation principles published for the 2021–2022 academic year (Ministry of National Education, 2020; Ministry of Youth and Sports, 2021).

In Türkiye, the Ministry of National Education mandates compulsory physical education and sports courses within the formal curriculum across primary and lower secondary education levels through the Physical Education, Games, and Sports Curriculum, aiming to develop students' motor competence, physical

fitness, knowledge of active and healthy living, and social-emotional skills, while also supporting participation in school teams, tournaments, and club activities through extracurricular sports programs (Ministry of National Education, 2025). In this context, competition-based organizations, referred to as extracurricular sports activities coordinated by the Ministry of National Education and the Ministry of Youth and Sports, are carried out under the name of school sports activities. These informal activities complement the formal curriculum and provide social spaces that support students' integration with school identity. Formal physical education classes carry out this process with systematic teaching strategies, while extracurricular sports activities provide opportunities for experiencing and reinforcing performance in a real game context. In this context, in secondary education in Türkiye, formal and informal programs in physical education and sports stand out as two complementary pedagogical areas, as the formal structure involves rule-based and institutionalized practices, whereas informal sports activities provide a more flexible and participant-oriented learning environment that complements this structure (Yalçın, 2021).

When national and international studies examining the relationship between school sports and school attachment/belonging are evaluated together, it is observed that sports participation has significant and mostly positive effects on the psychosocial bonds that students establish with their school. Quantitative studies conducted in the context of Türkiye have shown that students who participate in school sports teams have higher levels of school belonging and commitment compared to their peers who do not engage in sports (Kangalgil et al., 2024; Serbest et al., 2025). Similarly, it has been reported that extracurricular sports activities conducted in secondary education increase students' levels of school commitment and strengthen their sense of belonging (Yılmaz, 2019; Yanık, 2018). Positive relationships between school climate, school life quality, and school attachment at the middle school level also indicate the supportive role of sports and social activities in enhancing the school experience (Dönmez & Taylı, 2018). However, some studies indicate that sports participation has an impact through indirect variables; for example, as technology addiction increases, school attachment decreases, and sports can play a balancing role in this process (Arslan et al., 2023). The worldwide research indicates that the student-athlete identity influences the relationship between academic and athletic obligations; these responsibilities may be perceived as harmonious in certain instances and as conflicting in others (O'Neil et al., 2021). The evidence suggests that organized school sports activities help children cultivate good attitudes towards school, mitigate emotions of rejection, and enhance their sense of worth within the educational setting. However, it is noted that the effect might differ based on contextual circumstances (such as school type, gender, grade level, financial level, etc.) and that sports provide more significant outcomes when assessed in conjunction with school environment and social support systems.

Many people think that school sports are an important part of both the educational and athletic systems (Marković et al., 2024). The main goal of school sports is to support students' physical, mental, and social development while promoting cooperation, respect for rules, and universal values such as justice, tolerance, and helpfulness, as well as raising awareness of the importance of sport for individuals, society, and the environment (Pehlivan, 2004). In this context, school sports are considered an intermediary structure that has both pedagogical and developmental functions, positioned in the interaction area between formal education and school culture (Bailey, 2006).

The literature shows that the middle school period (early adolescence) is a critical developmental stage in terms of psycho-social and academic adjustment; structured sports participation during this period can play a protective role in fostering a sense of belonging, self-regulation skills, and school attachment (Eccles & Barber, 1999; Fredricks & Eccles, 2006). It is stated that participation in extracurricular sports activities, in particular, contributes to students developing a stronger identification with the school climate and increasing their academic motivation (Farb & Matjasko, 2012). In this regard, it is suggested that school sports are not only related to physical health outcomes but also to behavioral, affective, and cognitive dimensions of school engagement (Fredricks et al., 2004).

School Engagement: Theoretical Foundation and Its Relationship with School Sports

School engagement is a multidimensional construct that explains a student's participation in school life and the psychological bond they form with the school (Jimerson, et al., 2003). In this sense, School attachment is a broad idea that includes a lot of things that can change how students feel about their schools (Libbey, 2004). School attachment refers to the bond students develop with various aspects of school and

academic life during the learning process and is largely shaped by the extent to which they align with the goals and achievements of the school (Maddox & Prinz, 2003). Audas and Willms (2001) define school attachment as students' participation in academic or extracurricular activities and their congruence with the institution's values and goals. Fredricks et al. (2004) contend that school attachment consists of three fundamental components: behavioral, emotional, and cognitive. Students who are behaviorally engaged are doing both schoolwork and things with friends. Students who participate in extracurricular activities such as sports tend to show higher academic achievement and stronger school engagement, which is conceptualized as a multidimensional construct encompassing emotional, behavioral, and cognitive dimensions, including students' feelings toward school, participation in school-related activities, and their intrinsic motivation and mental effort in the learning process (Jimerson et al., 2003; Can et al., 2025).

When looking at the behavioral aspect of school attendance, it is very important for students to participate not only in academic and social activities but also in a wide range of extracurricular activities (Arslan et al., 2023). People generally think that participating in extracurricular activities shows that you are interested in school (Fredricks et al., 2004). At this point, school sports stand out as an important structural element that strengthens the social and emotional bonds a student forms with the school environment (Eccles & Barber, 1999; Marsh & Kleitman, 2002). The types of extracurricular activities students participate in and how often they engage in them are important indicators of their level of involvement in school (Jimerson et al., 2003). It has been reported that students who participate in school sports develop a stronger identification with school identity and have a higher level of adherence to school rules (Mahoney et al., 2003). This situation shows that sports are not just a physical activity; they are a means of social integration and integration with school culture. In this sense, it can be said that there is a relationship between school sports and school attendance. The literature contains studies investigating the correlation between participation in school sports and levels of school attachment (Öğredik, 2024; Yanık, 2018; Yılmaz, 2019). Beyond these contexts, digital games, an increasingly complex ecosystem that attracts individuals of all ages, emerge as another significant variable.

The Relationship Between Digital Games and Addiction

Digital games are games produced, presented, and played through digital technology. Generally speaking, they can be considered works of art, design, technology, and research (Bleumers et al., 2012). Frasca (2001) defined digital games as leisure activity software that allows individual or multiple participants to engage with the game devices, either alone or interactively, through an online network, installed on the devices. Similarly, Kerr (2006) defines digital games as games played within a specific set of rules and goals, through various digital devices (e.g., mobile phone, tablet, game console, etc.). Recent technological advancements have greatly affected the quick spread of digital games. The fact that computers, tablets, smartphones, and game consoles are all easy to get to has made the switch from traditional to digital gaming even faster. Digital games have become a useful tool for helping kids grow not only in their motor skills but also in their social and cognitive skills. Furthermore, it may be asserted that digital games may significantly influence other facets of children's lives, including their academic performance and degree of school participation. Doğan (2016) points out that many traditional games where kids used to play outside with friends have been slowly replaced by digital games. This is due to advancements in information and communication technology, as increased technology use has been found to be significantly associated with lower levels of physical activity among children (Alotaibi et al., 2020). Digital and traditional games have a lot in common in terms of how they work and what they mean. The distinguishing factors include the type of games played, the number of players, the tools and equipment used, the game's content, and the formal differences (Hazar et al., 2007).

Children who are more engaged with new technologies tend to show greater interest in digital games, whose interactive and emotionally engaging features can contribute to prolonged use and the development of game addiction (Yalçın-Irmak & Erdoğan, 2016). Children may sacrifice sleep, nutrition, and real-life social interactions to spend more time in the virtual environment, where the constantly evolving nature of digital games and the desire to achieve successive goals can transform the intention of "just a few more minutes" into prolonged periods of play (Sherry et al., 2006). This situation gave rise to the notion of digital gaming addiction in academic literature. People who are addicted can't stop doing or using something, and they can't

live without it. In this case, the person keeps doing or using something even though they don't want to. Over time, this makes it harder for the person to do their daily tasks, keep up with their social life, and meet their obligations. Furthermore, addiction can result in a decline in functionality across various aspects of life, as a substantial amount of an individual's time and physical energy becomes focused on the substance or behavior in question (Kodaman & Dinç, 2016). Digital game addiction is considered a subtype of technology and internet addiction and is classified as a behavioral addiction characterized by compulsive and excessive use, loss of control, and repetitive gaming behaviors (Lemmens et al., 2009).

Factors such as prolonged gaming time, preferred game types, and lack of parental supervision increase the risk of negative outcomes associated with digital gaming, while digital game addiction is linked to various health problems, including eating disorders and sleep disturbances due to prolonged inactivity (Otsuka et al., 2021). It is observed that various negative outcomes, such as aggressive behavior, social isolation, and addiction, are also frequently examined, particularly in connection with the harmful aspects of violent digital games (Ferguson, 2007). Gentile et al. (2011) conducted a study investigating the correlations between digital game addiction, depression, and academic achievement in children and adolescents. Research findings indicate that individuals with gaming addiction exhibit various psychosocial problems, including depression, anxiety, and social difficulties, along with lower academic performance, although the specific patterns of these outcomes may vary across studies (Gentile et al., 2011; Lemmens et al., 2011; Mihara & Higuchi, 2017). Additionally, it is stated that digital games can lead to a blurring of the boundaries between reality and imagination in individuals, a decrease in emotions and feelings, and consequently, negative changes in interpersonal relationships (Mehroof & Griffiths, 2010).

Children who grew up immersed in technology and continued their development through digital tools can be considered the most effective users of technology and the generation with the highest level of technological literacy (Novrialdy et al., 2019). In this context, it can be stated that it is not possible to keep the new generation completely away from technology. Because technology is considered one of the fundamental elements that is present in almost every aspect of modern life and makes daily life easier. In this regard, it can be asserted that it is difficult to completely remove digital games from children's lives. However, it can also be said that if these games are played in a moderate, controlled, and conscious manner, they can continue their educational or entertaining functions without posing a risk of addiction, and this will not lead to any negative consequences. Yalçın-Irmak and Erdoğan (2016) stated that educational, informative, and constructive digital games, when played within controlled and reasonable time limits, can be a supportive tool for the development of children and adolescents. Pepe (2011) stated that digital games have a positive impact, especially on an individual's mental development. The impact of digital games on children, both beneficial and detrimental, is significantly influenced by the manner, duration, and substance of their engagement with these games.

Upon reviewing the literature, it is evident that the correlation between digital game addiction and physical activity and sports engagement at the middle school level was mostly been investigated via quantitative and relational survey methodologies. In the study conducted by Hazar et al. (2017), a negative and significant relationship was found between middle school students' digital game addiction and their levels of physical activity; it was determined that as physical activity increased, the scores of digital game addiction decreased. In the study published in Spormetre, it was reported that the levels of digital game addiction among middle school students significantly varied, particularly according to gender, age, and daily game duration; the level of addiction increased in male students and as the game duration increased (Hazar et al., 2020). In the study conducted on students participating in the summer sports school, it was found that attitudes toward playing digital games showed significant differences based on gender and daily gaming duration; however, the duration of sports practice alone was not determined to be a decisive variable (Yazıcıoğlu et al., 2021). Therefore, the existing literature suggests that school-based sports participation may potentially have a reducing effect on digital game addiction, but this relationship should be evaluated within the framework of multidimensional variables.

Purpose, Importance, and Problem Statement of the Research

When the current literature is carefully examined, it is observed that studies either address digital game addiction and physical activity, digital game behaviors and sports participation, or school sports and

school attachment at the level of binary variables. However, there appears to be no research that simultaneously examines the variables of school sports participation, digital game addiction, and school attachment among middle school students. However, during the basic education period, both the student's inclination toward digital environments and the emotional bond they establish with the school are shaped within the same developmental process. The examination of these three variables together is considered quite important in terms of holistically revealing the potential of sports to support not only physical but also behavioral regulation and school attachment. In terms of educational literature, this approach offers the opportunity to fill an interdisciplinary gap by testing the potential protective role of sports against digital addiction and its function on school attachment within the same model. Especially in the context of primary education, this holistic analysis can significantly contribute to the development of policies and programs aimed at practice, in terms of both fostering healthy lifestyle habits and cultivating positive attitudes toward school among students.

The middle school years are a very important period for students to develop their digital habits and emotional connections to school (Fredricks et al., 2004). Increases in digital gaming, changes in physical activity levels, and participation in school sports can directly influence students' academic and social adjustment (Bailey, 2006; Fredricks et al., 2004; Gentile et al., 2011); however, existing research has predominantly examined these variables through isolated or pairwise relationships, such as the effects of physical activity on health outcomes (Janssen & LeBlanc, 2010) or the role of social support in school engagement (Wang & Eccles, 2012), and studies that simultaneously integrate school sports participation, digital game addiction, and school connection within a comprehensive model remain limited.Therefore, the simultaneous analysis of these characteristics is crucial for developing pedagogical techniques in primary education and for designing school-based intervention programs. In this respect, the study seeks to examine the degrees of digital game addiction and school engagement among middle school students in relation to their participation in school sports. From this point of view, the main research question of the study is stated as follows: What is the relationship between middle school students' participation in school sports, their levels of digital game addiction, and their commitment to school? The sub-research inquiries are as follows;

1. Do middle school students' digital game addiction scores show significant differences by gender?
2. Do middle school students' school engagement scores show significant differences by gender?
3. Do digital game addiction scores show significant differences based on participation in school sports?
4. Do school engagement scores show significant differences based on participation in school sports?
5. Do digital game addiction and school engagement scores show significant differences according to grade level?
6. Is there a significant relationship between digital game addiction and school engagement?

Method

Research Design

This study utilized a quantitative research methodology to investigate the prevalence of digital game addiction and school attachment among middle school students, specifically in relation to their participation in school sports. The study employed a descriptive survey model to elucidate the current situation and identify the differences among the variables.

The descriptive survey model, which falls under quantitative research, aims to present the current situation using quantitative data (Creswell, 2014). In this sense, it can be defined as a research design that allows for the description of the views, attitudes, behaviors, or characteristics of individuals located in a specific universe (Karasar, 2006). In the current study, in line with this research model, it was aimed to measure the digital game addiction and school attachment levels of students, and to examine whether these two variables showed a significant difference based on their participation in school sports.

The independent variable of the study is the students' participation status in school sports (participant–non-participant), and the dependent variables are the level of digital game addiction and the

level of school attachment. Since the study aimed to analyze the current situation, no intervention or experimental application was carried out.

Study Group

The participants of this investigation include all middle school students aged 10-14 enrolled in the center of Kastamonu province for the 2024-2025 academic year. Because it is hard to look at the whole universe, the study used both purposive sampling and convenience sampling as the sampling method. Time and accessibility were taken into account when choosing participants using the convenience sampling method (Büyüköztürk et al., 2023), while the following criteria were used to get more detailed information using the purposive sampling method (Patton, 2015).

The criteria for inclusion in the study are as follows: (i) being in the age range of 10–14, (ii) being an active student in the relevant schools during the 2024–2025 academic year, and (iii) having submitted a parental consent form. Forms with incomplete data and students without voluntary participation consent were excluded from the research scope. In this context, three state middle schools in the center of Kastamonu, which show different socio-economic characteristics and physical conditions, were included in the scope of the research. In the selection of the schools, both the regular conduct of school sports activities and the potential variation in students' access to digital games were taken into consideration.

In the selection of schools, their location in different neighborhoods and the diversity in student profiles were taken into account. No official institutional data regarding the socio-economic level was used; it was anticipated that student profiles might differ based on the environmental characteristics of the schools and discussions with school administrations. Differences in physical conditions were determined based on criteria such as the presence or absence of a gymnasium, the capacity of the school's outdoor sports facilities, the number of weekly sports activities, and the number of active sports teams at the school. The criterion of "regularly conducting school sports activities" is defined as the school's participation in official competitions at the provincial/district level in at least two different sports (for example, football, volleyball, basketball, athletics) and the regular implementation of weekly training programs.

Participants were reached through in-person field visits conducted in coordination with school administrations following the necessary institutional permissions. The level of students' access to digital games was determined through short preliminary questions posed before the data collection process. In this context, students were asked about their daily digital gaming duration, weekly gaming frequency, which platform(s) they use to play games (mobile, computer, console, etc.), and whether they play online games. These questions were used to evaluate the intensity of students' access to the digital gaming environment and the continuity of their usage through behavior-based indicators. Demographic information about the research group is presented in Table 1.

Table 1

Demographic Characteristics of the Study Group

Variable	Group	N	%
Gender	Female	192	46,2
	Male	224	53,9
	Total	416	100,0
Grade Level	5th Grade	108	26,0
	6th Grade	72	17,3
	7th Grade	106	25,5
	8th Grade	130	31,3
	Total	416	100,0
Participation in School Sports	Participated	174	41,8
	Did not participated	242	58,2
	Total	416	100,0

Data Collection Tools

When it came to the process of gathering information for the research project, a form consisting of three sections was applied. The participants' personal information was collected through the use of a personal information form, which was located in the first half of the form. In the second part of the study, scales were utilized to determine the extent of addiction to interactive video games. In the third and final segment, various scales were utilized in order to ascertain the degree of connection that each participant had with their respective educational institution. Information regarding the scales and personal information form is presented in this section.

Information Form for Personal Use: The researcher developed a form that was used to collect personal information. Concerning this particular case, the form contains three questions related to gender, grade level, and involvement in school athletics.

Digital Game Addiction Scale for Children: This study utilized the DGAC created by Hazar and Hazar in 2017, to assess the digital game addiction levels among the participants. The developed scale is a measurement tool developed to determine children's levels of addiction to digital games, and its validity DGAC and reliability was proven. The scale was developed using a 5-point Likert-type rating model. The scale consists of 24 items with four sub-dimensions.

The internal consistency coefficient for the total scale, calculated using Cronbach's alpha, was found to be high. The reliability coefficients for the subdimensions ranged between .86 and .90. The total score that can be obtained from the scale ranges from 24 to 120. Higher scores on the scale indicate a higher level of digital game addiction.

School Engagement Scale: Initially created by Fredricks et al. (2005) and subsequently modified for Turkish by Çengel et al. (2017), this tool was employed to evaluate the participants' levels of school connectedness. The study, conducted at the middle school student level, proved that the scale is suitable for Turkish culture, valid, and reliable. The scale was developed using a 5-point Likert-type rating model. The scale consists of 19 items with three sub-dimensions. Three items are scored in reverse.

The internal consistency of the overall scale, calculated using Cronbach's alpha, was found to be high. The reliability coefficients for the subscales ranged between .68 and .89. A higher score on the scale indicates a higher level of digital game addiction.

The scales used in the research were contacted, and permission for use was obtained from the respective scale owners. The permission processes were conducted via email, and the written approval documents were archived by the researchers. No changes were made to the original structure of the scales; the implementation was carried out in accordance with the guidelines recommended by the developers.

Data Collection

Before initiating the data collection process, the required permissions were secured from the Ministry of National Education, followed by the acquisition of an ethics committee certificate **(**Bartın University Social and Human Sciences Ethics Committee, 12.02.2025, 2025-SBB-0063). In this context, permission to conduct the study was obtained by contacting the administrations of the selected schools and providing detailed information regarding the purpose, scope, and methodology of the research. With the support of the teachers, Parent Consent Forms were distributed to the students. Students were informed in writing and verbally that participation is voluntary. Additionally, a brief overview of the research topic, scope, and methodology was provided. The research was conducted during the spring semester of the 2024-2025 academic year, from March to May 2025.

Research data were collected online through Google Forms. In the introduction section of the form, participants were informed about the purpose of the research, privacy principles, and the principle of voluntary participation. Students' participation was entirely based on the principle of voluntariness, and no personal information was requested. The data has been automatically recorded and stored in the Google Form system. The data were accessed only by the researcher. The obtained data were included in the analysis phase after excluding incomplete or incorrectly filled forms.

Informed voluntary participation/consent forms were delivered to the students' parents, and written permissions were collected face-to-face. No student was included in the research without obtaining consent from their parents. The implementation was carried out in the school environment and during class hours, under the supervision of the researcher. Students filled out the online form in a computer lab or a smart board-supported classroom environment. During the data collection process, the researcher and the relevant teacher were present in the classroom; the students were provided with the necessary technical guidance, but their responses were not interfered with. The completion of the form took an average of 15–20 minutes.

Data Analysis

The data obtained within the scope of the research were analyzed using the SPSS 26.0 software package. First, in order to determine the appropriateness of the analyzes and whether the assumptions were met, missing, erroneous, or outlier data were examined, and normality tests were applied. In this context, the data of 6 participants were excluded from the analysis. The normality of the data was evaluated using skewness, kurtosis, and the Shapiro–Wilk tests; it was determined that the skewness and kurtosis values were within the ±1 range and that the Shapiro–Wilk test results were not significant ($p > .05$). These findings indicate that the data meet the assumption of normal distribution. Therefore, parametric tests were used in the analyzes. In all applications conducted during the analysis process, the statistical significance level was accepted as $p<0.05$.

Cronbach's Alpha (α) coefficients were calculated to determine the internal consistency and reliability of the data collection tool used in the study. In this context, the coefficient values are $\alpha = .975$ for the Digital Game Addiction Scale, the alpha for the School Commitment Scale was found to be .868. When the two scales are evaluated together, the reliability coefficient is found to be $\alpha = .966$. Thus, it indicates that the data collection tools used within the scope of the research are highly reliable. Nunnally and Bernstein (1994) state that Cronbach's alpha values of 70 and above are acceptable; values above 80 are good. Those over 90 indicate an excellent level of reliability.

Frequency and percentage values were calculated to determine the demographic characteristics of the research group and general trends regarding key variables. The distribution of data regarding participants' gender, grade level, and participation in school sports was explained. The Independent Samples T-Test was applied to determine whether the digital game addiction and school attachment scores of the research group showed a significant difference based on gender and participation in school sports. To examine whether digital game addiction and school attachment scores differed by grade level, a One-Way Analysis of Variance (ANOVA) was applied. First, the Levene's test was applied to test the homogeneity of variances, and since the assumption was not met, the Post Hoc Games-Howell test was applied. Pearson Correlation Analysis was conducted to determine the relationship between digital game addiction and school attachment levels.

Findings

Prior to the analysis, the normality of the data was examined. In this context, skewness, kurtosis, and Shapiro–Wilk test results were evaluated. The results of the normality test are presented in Table 2.

Table 2.

Normality Test Results

Scale	N	Skewness	Kurtosis	Shapiro-Wilk	p
Digital Game Addiction Scale	416	-0,421	-0,285	0,972	,064
School Engagement Scale	416	-0,365	-0,198	0,978	,081

The skewness and kurtosis values are within the acceptable range of ±1, and Shapiro–Wilk test results are non-significant ($p > .05$), indicating that the data are normally distributed. Therefore, parametric tests were used in the analysis.

The reliability of the data collection instruments was examined prior to the analysis. In this context, Cronbach’s alpha coefficients for the Digital Game Addiction Scale and the School Engagement Scale were calculated. The reliability results are presented in Table 3.

Table 3

Cronbach's Alpha Reliability Coefficients for the Scales

Scale	Cronbach's Alpha (α)	N	Number of Items
Digital Game Addiction Scale	0,975	416	24
School Engagement Scale	0,868	416	19

As presented in Table 3, the Cronbach's alpha coefficient was found to be α = .975 for the Digital Game Addiction Scale and α = .868 for the School Engagement Scale. These values indicate that both scales demonstrate high internal consistency.

Differences in Digital Game Addiction Scale (DGAC) scores according to participation in school sports were examined. In this context, an independent samples t-test was applied. The results are presented in Table 4.

Table 4

T-Test Results for DGAC According to Participation in School Sports

Scale	Subdimension	Participation Status	N	X̄	SD	f	t	p
Digital Game Addiction Scale	Excessive Focus on and Conflict Related to Digital Gaming	Participating	174	2,224	0,902	58,924	-8.149	.000
		Not Participating	242	3,079	1,151			
	Tolerance Development During Gameplay and Value Attributed to Gaming	Participating	174	2,543	0,971	1.394	-7.237	.000
		Not Participating	242	3,249	0,987			
	Postponement of Individual and Social Duties/Responsibilities	Participating	174	2,057	0,881	96.058	-7.512	.000
		Not Participating	242	2,863	1,202			
	Psychological–Physiological Reflections of Withdrawal and Immersion in Gaming	Participating	174	2,129	0,966	60.730	-7.151	.000
		Not Participating	242	2,933	1,236			

Table 4 shows the findings for the sub-dimensions of the DGAC on the basis of participation in school sports. A significant difference was observed between students who took part in school sports and those who did not, in the subdimension of excessive focus and conflict related to playing digital games (t=-8.149, p<0.05). In this context, the study found that the average scores of students participating in school sports (X̄ = 2.224) were significantly lower than those of students who did not participate (X̄ = 3.079). Similarly, the results indicated a statistically significant difference between students who participated in school sports and those who did not, in terms of the development of tolerance during the game and the value attributed to the game (t=-7.237, p<0.05). In this context, the average scores of students participating in school sports (X̄ = 2.543) were found significantly lower compared to those who did not participate (X̄ = 3.249). A statistically significant difference was also observed between students who participated in school sports and those who did not in the subdimension of delaying individual and social duties/assignments (t=-7.512, p<0.05). Findings also revealed that the average scores of students participating in school sports (X̄ = 2.057) were significantly lower compared to those who did not participate (X̄ = 2.863). Finally, the study found a statistically significant difference between students who participated in school sports and those who did not in the psychological-physiological reflection of deprivation and the subdimension of immersion in the game (t=-7.151, p<0.05). It was revealed that the scores of students participating in school sports (X̄ = 2.129) were significantly lower than the average scores of students who did not participate (X̄ = 2.933). Finally, a statistically significant difference was found in the "Psychological–Physiological Reflections of Withdrawal and Immersion in Gaming" subdimension (t = -7.151, p < .05). Students who participated in school sports had lower mean scores (X̄ = 2.129) than those who did not participate (X̄ = 2.933).

Differences in School Engagement Scale (SES) scores according to participation in school sports were examined. In this context, an independent samples t-test was applied. The results are presented in Table 5.

Table 5

T-Test Results for the SES Scale According to Participation in School Sports

Scale	Subdimension	Participation Status	N	X̄	SD	f	t	p
School Engagement Scale	Behavioral Engagement	Participating	174	2,885	0,606	0,948	-5,959	.000
		Not Participating	242	3,239	0,592			
	Emotional Engagement	Participating	174	2,450	0,651	0,307	-10,264	.000
		Not Participating	242	3,118	0,657			
	Cognitive Engagement	Participating	174	2,879	0,864	8,302	-5,305	.000
		Not Participating	242	3,302	0,755			

Table 5 presents the analysis results for the subscales of the SES Scale based on students' participation in school sports. A statistically significant difference was found in the Behavioral Engagement subdimension between students who participated in school sports and those who did not ($t = -5.959$, $p < .05$). In this instance, the mean scores of the participating students ($\bar{X} = 2.885$) were markedly inferior to those of the non-participating students ($\bar{X} = 3.239$). There was also a big difference in the Emotional Engagement subscale ($t = -10.264$, $p < .05$). The average score for students who played sports at school was 2.450, which was lower than the average score for those who didn't. Lastly, there was a statistically significant difference in the Cognitive Engagement subdimension ($t = -5.305$, $p < .05$). The average scores of students who played sports at school ($\bar{X} = 2.879$) were much lower than those of students who did not play sports ($\bar{X} = 3.302$).

Differences in the subdimensions of the Digital Game Addiction Scale (DGAC) according to gender were examined. In this context, an independent samples t-test was applied. The results are presented in Table 6.

Table 6

T-Test Results for the Subdimensions of the DGAC by Gender

Scale	Subdimension	Gender	N	X̄	SD	f	t	p
Digital Game Addiction Scale	Excessive Focus on and Conflict Related to Digital Gaming	Female	192	2,486	1,107	1,106	-4.066	.001
		Male	224	2,932	1,119			
	Tolerance Development During Gameplay and Value Attributed to Gaming	Female	192	2,771	1,062	3.070	-3.371	.001
		Male	224	3,114	1,000			
	Postponement of Individual and Social Duties/Responsibilities	Female	192	2,365	1,102	7.460	-2.748	.006
		Male	224	2,673	1,173			
	Psychological–Physiological Reflections of Withdrawal and Immersion in Gaming	Female	192	2,390	1,194	0.499	-3.352	.001
		Male	224	2,781	1,178			

Table 6 presents the results of the independent samples t-test examining the subdimensions of the Digital Game Addiction Scale (DGAC) by gender. The findings indicate that there are statistically significant differences between female and male students across all subdimensions of the scale. A statistically significant difference was found in the subdimension of excessive focus on and conflict related to digital gaming ($t = -4.066$, $p < .05$). The results revealed that the mean score of female students ($\bar{X} = 2.486$) was lower than that of male students ($\bar{X} = 2.932$). Similarly, a significant difference was observed in the subdimension of tolerance development during gameplay and the value attributed to gaming ($t = -3.371$, $p < .05$). The analysis showed that female students had lower mean scores ($\bar{X} = 2.771$) compared to male students ($\bar{X} = 3.114$). In the subdimension of postponement of individual and social duties/responsibilities, a statistically significant difference was also identified ($t = -2.748$, $p < .05$). The findings indicated that the mean score of female students ($\bar{X} = 2.365$) was lower than that of male students ($\bar{X} = 2.673$). Finally, a statistically significant difference was found in the subdimension of psychological–physiological reflections of withdrawal and immersion in gaming ($t = -3.352$, $p < .05$). The results demonstrated that female students ($\bar{X} = 2.390$) had lower mean scores compared to male students ($\bar{X} = 2.781$).

Differences in the subdimensions of the School Engagement Scale (SES) according to gender were examined. In this context, an independent samples t-test was applied. The results are presented in Table 7.

Table 7

T-Test Results for the Subdimensions of the SES Scale by Gender

Scale	Subdimension	Gender	N	X̄	SD	f	t	p
School Engagement Scale	Behavioral Engagement	Female	192	3,059	0,575	4,417	-0,968	.334
		Male	224	3,118	0,663			
	Emotional Engagement	Female	192	2,761	0,710	1,651	-2,074	.039
		Male	224	2,911	0,746			
	Cognitive Engagement	Female	192	3,000	0,878	6,272	-2,871	.004
		Male	224	3,236	0,773			

Table 7 presents the results of the independent samples t-test examining the subdimensions of the School Engagement Scale (SES) by gender. The findings indicate that gender-based differences vary across the subdimensions of the scale. No statistically significant difference was found between female and male students in the Behavioral Engagement subdimension ($t = -0.968$, $p > .05$). Although male students ($\bar{X} = 3.118$) had slightly higher mean scores than female students ($\bar{X} = 3.059$), this difference was not statistically significant. In contrast, a statistically significant difference was observed in the Emotional Engagement subdimension ($t = -2.074$, $p < .05$). The analysis revealed that female students ($\bar{X} = 2.761$) had lower mean scores compared to male students ($\bar{X} = 2.911$). Similarly, a statistically significant difference was found in the Cognitive Engagement subdimension ($t = -2.871$, $p < .05$). The results indicated that the mean scores of female students ($\bar{X} = 3.000$) were lower than those of male students ($\bar{X} = 3.236$).

Differences in the mean scores of the Digital Game Addiction Scale (DGAC) according to grade level were examined. In this context, one-way ANOVA and Games–Howell post hoc tests were applied. The results are presented in Table 8.

Table 8

ANOVA and Post Hoc Games-Howell Test Results for Mean Scores of the DGAC Scale by Grade Level

Grade Level	N	X̄	SD	f	p	Significant Differences
5th Grade (5)	108	2,861	1,023			
6th Grade (6)	72	3,045	1,023			
7th Grade (7)	106	2,864	1,152	10,642	,000	5-8, 6-8, 7-8
8th Grade (8)	130	2,305	0,953			
Total	**416**	**2,720**	**1,072**			

Table 8 shows the average scores on the DGAC scale by grade level, as well as the results of the ANOVA and Post Hoc Games-Howell tests. There was a statistically significant difference between the average scores of the DGAC based on grade level ($f=10.642$, $p<0.05$). It was decided that the 8th-grade average score ($\bar{X} = 2.305$) was much lower than the average scores for the 5th grade ($\bar{X} = 2.861$), 6th grade ($\bar{X} = 3.045$), and 7th grade ($\bar{X} = 2.864$).

Differences in the mean scores of the School Engagement Scale (SES) according to grade level were examined. In this context, one-way ANOVA and Games–Howell post hoc tests were applied. The results are presented in Table 9.

Table 9

ANOVA and Post Hoc Games-Howell Test Results for Mean Scores of the SES Scale by Grade Level

Grade Level	N	X̄	SD	f	p	Significant Differences
5th Grade (5)	108	3,045	0,676			
6th Grade (6)	72	3,169	0,682			
7th Grade (7)	106	3,087	0,668	3,725	,012	6-8
8th Grade (8)	130	2,880	0,583			
Total	**416**	**3,02**	**0,654**			

Table 9 presents the mean scores of the School Engagement Scale (SES) according to grade level, along with the results of the one-way ANOVA and the Games–Howell post hoc test. The analysis revealed a statistically significant difference in SES scores across grade levels ($F = 3.725$, $p < .05$). According to the results of the Games–Howell post hoc test, the significant difference was observed between 6th-grade and 8th-grade students. In this context, it was determined that the mean score of 8th-grade students ($\bar{X} = 2.880$) was lower than that of 6th-grade students ($\bar{X} = 3.169$).

The relationships between the subdimensions of the Digital Game Addiction Scale (DGAC) and the School Engagement Scale (SES) were examined. In this context, Pearson correlation analysis was conducted. The results are presented in Table 10.

Table 10

Pearson Correlation Analysis Results for the Subdimensions of the DGAC and SES Scales

	SES1	SES2	SES3	DGAC1	DGAC2	DGAC3	DGAC4
Behavioral Engagement (SES1)	1						
Emotional Engagement (SES2)	,679**	1					
Cognitive Engagement (SES3)	,613**	,645**	1				
Excessive Focus on and Conflict Related to Digital Gaming (DGAC1)	,570**	,634**	,587**	1			
Tolerance Development During Gameplay and Value Attributed to Gaming (DGAC2)	,532**	,616**	,580**	,876**	1		
Postponement of Individual and Social Duties/Responsibilities (DGAC3)	,575**	,620**	,512**	,928**	,847**	1	
Psychological–Physiological Reflections of Withdrawal and Immersion in Gaming (DGAC4)	,540**	,586**	,496**	,890**	,843**	,930**	1

The findings of the Pearson correlation analysis between the subdimensions of the DGAC and SES scales are illustrated in Table 10. The analysis demonstrated a statistically significant positive correlation between all subdimensions of the DGAC scale and the subdimensions of school engagement. The correlations between the behavioral component of the SES and the subdimensions of the DGAC scale ranged from $r = .532$ to $r = .575$. The correlations with the affective aspect varied from $r = .586$ to .634, and the correlations with the cognitive aspect varied from $r = .496$ to .587.

Discussion

The study investigated the relationship between middle school kids' digital gaming addiction and their academic engagement, with a particular focus on their involvement in sports activities. The average scores of participants regarding digital game addiction and school connection were analyzed in relation to their involvement in school sports, as well as demographic factors like gender and grade level. A correlation analysis was conducted to examine the relationship between the subdimensions of digital gaming addiction and levels of school attachment.

The main aim of the study was to examine the levels of digital game addiction among middle school students by taking into account their participation in school sports. The findings revealed statistically significant differences across all four subdimensions of the Digital Game Addiction Scale. Table 4 presents the results in detail. The results indicate that students who participate in school sports have lower mean scores in the subdimension of excessive focus on and conflict related to digital gaming compared to those who do not participate ($\bar{X} = 2.224 < 3.079$; $t = -8.149$; $p < .001$). Similarly, in the subdimension of tolerance development during gameplay and the value attributed to gaming, it was found that students participating in school sports had lower mean scores than non-participating students ($\bar{X} = 2.543 < 3.249$; $t = -7.237$; $p <$

.001). In the subdimension of postponement of individual and social responsibilities, students participating in school sports exhibited lower mean scores compared to those who did not participate ($\bar{X}$ = 2.057 < 2.863; t = -7.512; p < .001). Likewise, in the subdimension of psychological–physiological reflections of withdrawal and immersion in gaming, participating students had lower mean scores than their non-participating peers ($\bar{X}$ = 2.129 < 2.933; t = -7.151; p < .001). Overall, the findings suggest that participation in school sports is associated with lower levels of digital game addiction.

A review of the current literature reveals a deficiency of studies exploring the relationship between digital gaming addiction and participation in school sports. Öcal and Metin's (2022) study shows some similarities to this one in terms of themes, but it is different in terms of the scales used, the methods of analysis, and the outcomes. The study demonstrated no substantial disparity in average digital game addiction scores associated with participation in school sports. Consequently, this result deviates from the conclusions of the present investigation. Conversely, there exist studies in the literature that corroborate the present research. Hazar and Ekici (2021) examined the relationship between digital gaming addiction and perceptions of bullying among middle school pupils. They discovered that adolescents engaged in sports had significantly lower digital game addiction ratings compared to their non-sporting counterparts, both in aggregate and in certain sub-dimensions ($\bar{X}$ = 52.62 < 59.15; t = -3.947; p < 0.05). The results of this study align with those found in this research. Hazar et al. (2017) investigated middle school children and found that those who did not engage in regular athletics had higher digital game addiction scores compared to their peers who did participate ($\bar{X}$ = 45.64 < 49.40; t = -1.91; p < 0.05). These results are consistent with the current study, suggesting that physical exercise may function as a protective factor against digital gaming addiction. Moreover, the study conducted by Güvendi et al. (2019) shown that students whose families promoted their participation in physical activity displayed significantly lower digital game addiction ratings compared to those who did not get such encouragement ($\bar{X}$ = 50.09 < 62.43; t = -3.462; p < 0.05). The present research findings correspond with these outcomes.

Overall, it can be said that organized sports events or regular participation in activities involving physical activity have a reducing effect on digital game addiction. One of the recent studies supporting this view is the work by Karaaslan et al. (2023). The investigation revealed a notable and inverse relationship between levels of physical activity and the incidence of digital game addiction among children identified with this condition (r = -0.659; p = 0.001).Based on this finding, it can be stated that as physical activity levels decrease, digital game addiction increases; in other words, participation in physical activity decreases as addiction levels rise. It can be said that one of the factors influencing this result is the concept of leisure time. It is believed that the large portion of free time spent by students participating in sports activities on activities such as training and competitions limits their inclination toward digital games. Booker et al. (2015) stated that the increase in digital screen use as a leisure activity negatively affects participation in sports events.

The results of this study suggest that the connections among involvement in school sports, digital game addiction, and school attachment at the primary education level must be examined within an educational framework. The middle school years are an important time for adolescents to grow and change. They start using digital media more and make friends at school. In this process, physical education classrooms are not just a place for children to be active; they are also a place where students learn how to control themselves, engage with their peers, and acquire a sense of responsibility. The current educational programs in Türkiye and the Türkiye Century Education Model include physical education within a framework that includes movement culture, knowledge of healthy living, and value education. This approach stresses that sports are not just a way to perform, but also a way to control behavior and build healthy habits (Ministry of National Education, 2025).

In the literature, findings showing that as the level of physical activity increases, the scores of digital game addiction decrease (Hazar et al., 2017) indicate that sports can play a balancing role. However, it has also been reported that the quality and continuity of sports participation are decisive; merely having a sports license or attending a sports school may not be sufficient to reduce addiction on their own (Hazar et al., 2020; Yazıcıoğlu Çalışan et al., 2021). This situation highlights the importance of conducting school sports in a structured and pedagogically-based manner. When the findings that extracurricular sports activities strengthen school attachment (Yılmaz, 2019) and the positive relationship between school climate and school

attachment (Dönmez & Taylı, 2018) are considered together, it is understood that formal physical education classes and informal sports activities are two complementary learning areas.

Table 5 presents the results of a T-test on the mean scores of students participating and not participating in school sports on the School Connectedness Scale. The analysis findings showed significant differences between groups in all three subdimensions of the scale. Accordingly, it was determined that the average scores of students participating in school sports in the behavioral dimension were lower compared to those who did not participate ($2.885 < 3.239$; $t = -5.959$; $p < 0.05$). In the affective dimension, the averages of students engaged in school sports were significantly lower than those not involved ($2.450 < 3.118$; $t = -10.264$; $p < 0.05$). Finally, in the cognitive dimension, the commitment levels of students engaged in school sports were inferior to those of non-participating students ($2.879 < 3.302$; $t = -5.305$; $p < 0.05$). A literature review shows that most studies show that being active in sports or physical activity makes students feel more connected to school (Serbest et al., 2025; Yılmaz, 2019; Arslan & Özdemir, 2022; Yanık, 2017). For example, Kangalgil et al. (2024) reported that students participating in school sports teams had significantly higher school attachment scores compared to non-participating students ($3.51 < 3.75$; $t = 2.927$; $p < 0.05$). Similarly, Yanık (2017) found that the school attachment levels of secondary school students who participated in school teams and school-based exercise activities were statistically significantly higher than those of students who did not participate. These findings indicate that sports participation has positive effects on school attachment in the general literature, but they differ from the findings of the current study in terms of results.

When evaluating the results related to school commitment, it is thought that a role conflict may arise for student athletes. Indeed, it is stated that students who primarily identify themselves as athletes participate less in classes and their interest in academic activities weakens (Santos & Sagas, 2023). It is emphasized that it is quite difficult to pursue both school and sports simultaneously, especially for young people; this situation is stated to even lead to some students dropping out of school (Tudor and Ridpath, 2019). Even though school sports may seem like extracurricular activities, the fact that they often happen at the same time as school hours can make it harder for students to do their schoolwork. A large number of students who play sports at school are also athletes who are active in sports clubs outside of school. Therefore, it is likely that the athlete role will become dominant in these students. The intensity of match and training schedules can weaken a student's connection to school and cause them to prioritize academic responsibilities.

Middle school is when students start to figure out who they are as students and how they feel about education. In this process, physical education classes aren't simply places to get exercise; they're also structured, formal learning environments where kids learn how to be responsible, work together, and feel like they belong. At present time, physical education is seen to be a way to help kids grow in many areas, such learning about values, healthy living, and movement culture. In this perspective, sports are not viewed as detrimental to academic achievement; instead, they are regarded as a pedagogical instrument that facilitates adaptability to the educational environment (Ministry of National Education, 2025).

The literature on school attachment emphasizes that strengthening a student's affective, behavioral, and cognitive ties to the school environment reduces the risk of absenteeism and school dropout. In this study, significant differences between participation in school sports and the sub-dimensions of school attachment indicate that sports may support the relationship between students and their school. Sports activities provide students with the opportunity to be visible within the school, interact with peer groups, and experience success. These experiences can particularly strengthen the dimensions of behavioral and affective engagement. Findings indicating that extracurricular sports activities increase school belonging (Yılmaz, 2019) and studies revealing the positive relationship between school climate and commitment (Dönmez & Taylı, 2018) show that sports are not only a physical but also a social and emotional learning domain.

Table 6 shows the average scores of the students who took part in the study on the Digital Game Addiction Scale, broken down by gender. The analysis results demonstrate statistically significant gender differences across all four subdimensions of the scale. So, it was found that the average scores of female students were lower than those of male students in the area of too much focus and conflict related to playing digital games ($2.486 < 2.932$; $t = -4.066$; $p < 0.05$). In the same way, it was noticed that female students'

average scores were much lower than male students' in terms of developing tolerance during game time and the value dimension of the game (2.771 < 3.114; t = -3.371; p < 0.05). In terms of delaying individual and social tasks/assignments, female students also have lower dependence scores (2.365 < 2.673; t = -2.748; p < 0.05). Finally, it was found that the average scores of female students were significantly lower than those of male students in the psychological-physiological reflection of deprivation and the game immersion subdimension (2.390 < 2.781; t = -3.352; p < 0.05). A review of the literature reveals that findings corroborating the current research results are prevalent. Ekinci et al. (2017) found that male high school students were much more likely to be addicted to digital games than female students (11.62 < 14.69; t = -10.74; p < 0.05). A study by Hazar and Ekici (2021) on middle school students revealed that male students exhibited elevated levels of addiction across both the overall scale score and all sub-dimensions. In a study by Küçük and Çakır (2020) on middle school students, it was also found that male students were significantly more addicted to digital games than female students. Various academic fields elucidate the potential causes of this situation in the literature. Dong and Potenza (2022) highlighted neurobiological and psychological mechanisms, stating that men have stronger reward systems associated with gaming, show higher sensitivity to game-related stimuli, and this increases the risk of addiction. Gisbert-Perez et al. (2024) stated that male students spend more time on digital games than female students, and that long-term gaming participation is one of the key factors increasing the risk of addiction. When these findings are considered together, it can be said that the higher levels of digital game addiction among male students may be related to both neurobiological sensitivity and behavioral usage patterns.

Table 7 presents the mean scores of the students participating in the study on the School Engagement Scale, categorized by gender. The analysis findings indicate that statistically significant differences vary across the subdimensions of the scale. Accordingly, it was determined that the average scores of male students on the scale in the behavioral dimension were higher than those of female students (3.059 < 3.118; t = -0.968; p > 0.05); however, this difference was not statistically significant. In the same way, it was found that male students' school engagement scores in the affective dimension were higher than those of female students (2.761 < 2.911; t = -2.074; p < 0.05), and this difference was statistically significant. In the cognitive dimension, it was ascertained that the mean scores of male students exceeded those of female students (3.000 < 3.236; t = -2.871; p < 0.05), indicating a statistically significant difference. A review of the literature indicates that the degree of school attachment varies by gender. Tuğrul (2021) found that male middle school students were more attached to school than female middle school students, which is in line with the results of this study (50.46 < 54.45; t = 3.80; p < 0.05). Johnson et al. (2006) demonstrated that gender differences can fluctuate by grade level; they observed that female students exhibited higher levels of attachment in middle school, whereas male students' attachment levels rose with advancing grade levels. Conversely, Kangalgil et al. (2024) identified no significant differences between boys and girls in their study of middle school students. A comprehensive review of these studies reveals that the correlation between school attachment and gender lacks a uniform pattern in the literature, as disparate results arise from various studies. People think that the differences in the sample's traits, like the level of education, the cultural context, the school climate, and the tools used to measure things, are what made this happen.

Table 8 shows how the scores of middle school students on the DGAC Scale changed based on the class variable in the study. The analyses demonstrated a statistically significant difference between grade level and digital game addiction (F = 10.642; p < 0.05). The average scores show that 8th graders ($\bar{X}$ = 2.305) are much less likely to become addicted than 5th graders ($\bar{X}$ = 2.861), 6th graders ($\bar{X}$ = 3.045), and 7th graders ($\bar{X}$ = 2.864). Upon reviewing the literature on class variables, it is clear that studies produce inconsistent findings. Marufoğlu and Kutlutürk (2021) contended that their research on middle school students indicated that grade level did not significantly influence digital game addiction. Likewise, Kaman and Bulut (2024) did not find a notable difference in addiction scores based on grade level. In contrast, Küçük and Çakır (2020) discovered that 8th-grade students exhibited higher digital game addiction scores than their counterparts in other grade levels, resulting in a divergent outcome from the present study. When these studies are analyzed collectively, it is apparent that digital game addiction does not demonstrate a uniform pattern in the literature concerning grade level, and notable discrepancies are evident among the studies. The results of this study indicate that the addiction scores of 8th-grade students were probably lower, mainly due to their exam preparation, extended study periods, and reduced gaming time. This situation shows that people are

less likely to play video games when they are stressed out about school and need to learn how to use their time better. This makes it less likely that they will become addicted.

Table 9 displays the School Engagement Scale scores for middle school students, categorized by grade level. The analysis results indicate a statistically significant difference in school engagement levels according to grade level ($F = 3.725$; $p < 0.05$). When examining the mean scores, it was found that 8th-grade students ($\bar{X} = 2.880$) had lower levels of school engagement compared to 5th-grade students ($\bar{X} = 3.045$), 6th-grade students ($\bar{X} = 3.169$), and 7th-grade students ($\bar{X} = 3.087$). Post-hoc analysis indicated that the significant difference was between 6th-grade and 8th-grade students. Additionally, the literature contains studies that identify similar trends. Bellici (2015) found that middle school students' attachment to school decreased as their grade level went up. Similarly, Ceylan and Özgenel (2022) also found that students' school attachment decreased as grade level increased. These findings are consistent with the results of the current research. When considering the rationale for this situation, it is thought that factors such as increased academic pressure and test anxiety as students progress through grade levels, psychosocial changes specific to adolescence, and differing priorities in the social environment can affect school attachment. Especially in the upper grades, the intensification of academic expectations and the shift of students' interests toward extracurricular activities can weaken their commitment to school.

Finally, Table 10 presents the results of the correlation analysis regarding the relationships between the mean scores of students on the DGAC scale and the School Connectedness Scale. The analysis findings indicate positive and significant relationships between all subdimensions of the DGAC scale and the subdimensions of the school attachment scale. Accordingly, it was determined that the correlation coefficients between the behavioral dimension of school commitment and the sub-dimensions of digital game addiction ranged from $r = .532$ to $r = .575$, the relationships between the affective dimension and the sub-dimensions ranged from $r = .586$ to $r = .634$, and the relationships between the cognitive dimension and the sub-dimensions ranged from $r = .496$ to $r = .587$. It is believed that this result is particularly related to the characteristics of the sample group included in the study. The results show that students who play sports at school have lower scores on both the digital game addiction and school attachment scales. On the other hand, students who don't play sports at school have higher scores on both scales. This situation may have resulted in elevated correlation coefficients due to the scores from the two scales fluctuating in the same direction within the same group. As a result, it can be said that the positive relationships found in this study are a sign of a pattern that comes from the way the sample group was set up, so the results need to be looked at in context.

Recommendations

Based on the research findings, various suggestions have been developed for relevant institutions and future studies on the topic. First of all, planning competitions held within the scope of school sports outside of class hours as much as possible will reduce the negative impact on student athletes' academic processes. In this regard, it is important to prepare and implement remedial programs for students participating in sports activities when necessary. To effectively manage this process, regular communication and cooperation must be established between physical education and sports teachers, school administration, and parents. Providing awareness-raising training for parents on digital games, game addiction, and controlled digital game use will also contribute to guiding students' behavior in a healthy way. Additionally, conducting future research on students from different socioeconomic levels and different types of schools will increase the generalizability of the findings. To gain a deeper understanding of the topic, the use of qualitative research designs and the examination of student experiences from a holistic perspective are also recommended for future studies.

From the perspective of educational sciences, physical education classes aim for outputs such as self-regulation, responsibility, cooperation, and value acquisition alongside psychomotor development as a planned part of the formal learning process; school sports serve as a complementary structure that creates the application and reinforcement area for these gains. Extracurricular sports activities, being based on voluntary participation, can be considered semi-formal/informal learning environments that strengthen students' motivation, social identity, and sense of belonging. According to the findings, the lower digital game addiction scores of students participating in school sports suggest that sports may have a positive impact on

behavior regulation by supporting time management and self-control skills. At the same time, the sports environment can contribute to strengthening the sense of school attachment by increasing student-teacher and peer interactions. In this context, establishing a more systematic integration between physical education classes and school sports, relating lesson achievements to school teams and club activities, and encouraging primary education students' participation in extracurricular sports activities are important for educational policies; as strengthening the pedagogical function of sports can lead to increased school attachment and a more holistic and sustainable educational approach to reducing behavioral risks such as digital game addiction.

Conclusion

The research concentrated on investigating the correlation between digital game addiction and school attachment among middle school students, specifically the influence of participation in school sports. The results demonstrate that students engaged in school sports exhibit statistically significantly lower levels of digital game addiction than their peers who do not participate. This result indicates that sports activities enable students to spend their leisure time in a healthier and more structured way, thus reducing the time spent on digital games. It can be said that the gains sport provides in cognitive, affective, and psychomotor domains play a regulatory function in students' game-playing behavior. In terms of school attachment, it was determined that the attachment levels of students who did not participate in school sports were significantly higher compared to student athletes. It is thought that this situation may be related to the athletic identity of student-athletes taking precedence over their student identity. Especially with the intensity of training and competition schedules, and the time and attention-demanding nature of sports activities, contrary to expectations, the emotional and behavioral attachment of student-athletes to school can be negatively affected. Although there are various inconsistencies in the literature regarding the gender variable, the current research, in line with the literature on digital game addiction, has shown that male students have higher levels of addiction. While a similar inconsistency is noticeable in terms of grade level, the findings of the current study align with some research by showing that school attachment levels decrease as grade level increases. Finally, positive and significant relationships were found between the subscales of both measures. It is assessed that these relationships stem particularly from the characteristics of the sample group and the different score distributions based on their participation in school sports.

CRediT authorship contribution statement

The author contributed to all aspects of the study, including conceptualization, methodology, data collection, formal analysis, writing—original draft preparation, and writing—review and editing.

Declaration of Conflicting Interests

The author claims that there are no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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Ethics Approval and Consent to Participate

This study was conducted in accordance with the ethical standards of scientific research. Prior to the initiation of the data collection process, the necessary permissions were obtained from the Ministry of National Education, followed by ethics committee approval (Bartın University Social and Human Sciences Ethics Committee, 12.02.2025, 2025-SBB-0063). The research protocol was approved by the ethics committee. Participation was voluntary, informed consent was obtained from parents, and anonymity and confidentiality were maintained throughout the study. No data were altered, fabricated, or falsified, and all procedures were carried out in accordance with international standards of publication ethics.

Declaration of AI Usage Statement

The authors affirm that no AI tools were employed in the preparation of this article

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