DIGITAL GAME ADDICTION IN PRIMARY SCHOOL CHILDREN: AN ANALYSIS IN TERMS OF USAGE HABITS AND DEMOGRAPHIC VARIABLES

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Abstract

This study aimed to examine the digital game addiction levels, usage habits, and technology exposure patterns of primary school students in relation to demographic variables such as gender, age, family structure, and duration of daily technology use. The research was conducted using a quantitative design based on a descriptive survey model to identify existing conditions and reveal the relationships among key variables. The study group consisted of 150 students enrolled in the 3rd, 4th, and 5th grades of a private primary school in the Turkish Republic of Northern Cyprus (TRNC) during the 2023–2024 academic year. Data were collected using a researcher-developed Personal Information Form and the *Computer Game Addiction Scale for Children*. Nonparametric statistical analyses were employed due to non-normal data distribution, including Kruskal–Wallis and Mann–Whitney U tests, with significance set at p < .05. The findings revealed that more than half of the participants (55.6%) used technological devices between one and three hours per day, while 9.2% reported daily use exceeding ten hours. The most common purpose of technology use was playing games (37.9%), followed by social media use (16.3%) and watching videos (14.4%). Statistical analysis showed a significant relationship between daily technology use duration and digital game addiction scores. Students who used technology for ten or more hours per day exhibited markedly higher addiction levels than other groups. Moreover, technology used primarily for entertainment purposes—especially gaming—was found to be associated with higher addiction scores compared to educational use such as completing homework.

Keywords: Digital game addiction, primary school students, technology use, family structure, gender differences, digital learning.

INTRODUCTION

Childhood is a critical phase of the human life cycle in which physical, cognitive, emotional, and social development accelerate, laying the foundations of personality.Extending from birth to adolescence, this period encompasses not only biological maturation but also the profound effects of environmental interactions on the child. A healthy childhood experience directly shapes an individual's later psychological adjustment, social relationships, and learning abilities (Özer, Gürkan, & Ramazanoğlu, 2006; Erden & Bulut, 2023). Therefore, ensuring that children grow up in safe, supportive, and interactive environments that meet their developmental needs constitutes the cornerstone of social well-being.

Play is one of the most defining activities of childhood. For children, play serves not merely as a source of entertainment but as a means of making sense of the world, expressing emotions, and experimenting with social roles (Arslan & Dilci, 2018). The educational value of play has long been emphasized by developmental theorists such as Piaget, Vygotsky, and Bruner. According to Piaget, play is an activity through which children balance and reorganize their cognitive schemas, while Vygotsky viewed it as a "zone of proximal development" where learning occurs through social interaction. This perspective underscores that play contributes not only to cognitive growth but also to social maturation.

Through play, children explore their environment, develop problem-solving skills, and learn to understand others' feelings and perspectives. Hence, play represents a learning domain in which both

personal and social competencies are constructed (Bora Güneş & Çavuşoğlu, 2022; Burgaz Uskan & Bozkuş, 2019). However, in recent years, the concept of play has undergone a structural transformation under the influence of technology; traditional games emphasizing physical activity and face-to-face interaction have increasingly been replaced by virtual games played in digital environments.

The global digital transformation has profoundly reshaped how children spend their leisure time and how they learn. Technological devices such as smartphones, tablets, computers, and game consoles have shifted play from physical spaces to virtual ones, redefining children's domains of interaction (Horzum, 2011; Özarslan & Perdahcı, 2023). The decline of traditional playgrounds, parental safety concerns, and urbanization have further steered children toward digital gaming. Although digital games may offer certain benefits within contemporary educational approaches—such as enhancing attention, speed, and strategic thinking—uncontrolled and excessive use carries significant developmental risks (Doğan Keskin & Aral, 2021). These risks include social isolation, academic decline, physical inactivity, increased aggression, and addictive behaviors.

The pedagogical dimension of this transformation is equally significant. When integrated with educational technologies, digital games can serve as a supportive medium for learning (Green & Bavelier, 2003). However, when they shift from being a *learning tool* to an *escape space*, they can adversely affect children's developmental balance. Children between the ages of 6 and 12 are particularly vulnerable to the reward mechanisms of digital games because their cognitive control processes are not yet fully developed. This vulnerability has contributed to the rapid increase of gaming addiction during childhood.

Digital game addiction is a behavioral disorder characterized by a loss of control over gaming behavior, disruption of daily activities, and weakening of social relationships. The American Psychiatric Association (APA, 2013) classified this condition as *Internet Gaming Disorder* (IGD) in the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*, noting that it exhibits neuropsychological symptoms as severe as those observed in substance addiction (Yalçın Irmak & Erdoğan, 2016). According to the DSM-5, a diagnosis of gaming addiction can be made if at least five of the following nine criteria are met within a 12-month period: (1) preoccupation with gaming, (2) irritability when not playing, (3) increasing amounts of time spent gaming, (4) unsuccessful attempts to reduce or stop gaming, (5) loss of interest in other activities, (6) continued gaming despite negative consequences, (7) deception of others about gaming habits, (8) gaming as a means of escaping stress or guilt, and (9) impaired academic, social, or occupational functioning (APA, 2013).

In this context, digital game addiction should not be viewed merely as an individual habit but as a multidimensional problem that affects the family, school, and wider social environment. Prolonged gaming behavior in children has been linked to musculoskeletal problems, sleep disorders, irregular eating habits, attention deficits, aggression, and feelings of loneliness (Erden & Bulut, 2023; Güvendi, Tekkurşun Demir & Keskin, 2019).

The existing literature indicates that digital game addiction has a significant impact on children's social development.Primary-school-aged children, in particular, learn social norms and cooperative behaviors through play. Yet excessive engagement with digital games weakens these social learning processes and impedes the development of empathy (Yiğit & Mercan Uzun, 2022).

Furthermore, the reward systems of digital games, which stimulate dopamine release, orient children toward short-term pleasure. This tendency undermines the development of executive functions such as patience, self-control, and goal-directed behavior. Prolonged screen exposure is often associated with attention deficits, low academic performance, and social isolation (Mustafaoğlu & Yasacı, 2018). Some research also indicates that digital games can be beneficial when used appropriately. For instance, Green and Bavelier (2003) argued that action-based video games can enhance visual attention skills. However, these effects remain valid only when the duration and purpose of play are

properly regulated. Excessive and unmonitored use may trigger a cycle of dependency among children.

In the context of Türkiye and the Turkish Republic of Northern Cyprus (TRNC), research over the past decade indicates a growing scholarly interest in the topic of digital game addiction (Horzum, 2011; Yiğit & Günüç, 2020; Gökçen, 2023). However, most existing studies have been conducted with adolescents or high school students. The scarcity of empirical findings focusing on primary school children has led to the neglect of early symptoms of addiction in this age group. Moreover, the majority of studies employ quantitative methods, with limited attention given to mixed-method designs that integrate the perspectives of parents, teachers, and children in a holistic manner. The paucity of studies conducted specifically within the TRNC context further deepens this academic gap. Consequently, understanding how children's cultural, economic, and technological environments shape addictive behaviors remains challenging.

Accordingly, this study makes a pioneering contribution by investigating digital game addiction levels among primary school children in the TRNC. Its scope extends beyond merely determining addiction levels to analyzing the effects of variables such as age, gender, family structure, and duration of technology use on addictive behavior.

Despite the increasing international awareness of digital game addiction, research focusing on primary-school-aged children remains limited. Yet this developmental period is precisely when addictive tendencies can first be observed and early intervention programs can be implemented most effectively. Another notable gap in the literature concerns the absence of comprehensive models that examine the effects of digital game addiction on children's socio-emotional development, family relationships, and academic life. Research conducted in Türkiye and the TRNC largely addresses the prevalence of addiction, while neglecting deeper analyses of causality, inter-variable variation, and social context.Within this framework, the present study contributes to the literature by providing a regionally grounded dataset and addressing children's digital gaming habits through a multidimensional lens. The findings are expected to inform the development of early intervention strategies for teachers, parents, and school counselors. The rapid proliferation of digital technologies in recent years has fundamentally transformed children's play habits and introduced new developmental risks. Although existing literature highlights the physical, emotional, and social consequences of digital game addiction, it also points to the lack of integrative models that explain addictive tendencies among primary-school-aged children. In this context, the central research question guiding this study can be articulated as follows:

How do primary school children's levels of digital game addiction differ according to variables such as age, gender, family structure, and daily technology use, and how does this addiction influence their socio-emotional development?

Based on the reviewed literature, a conceptual framework was developed to explain the relationships among demographic characteristics, digital technology use behaviors, and digital game addiction in primary school children. This framework also incorporates the potential developmental outcomes of addiction and highlights the moderating role of digital balance and parental mediation (Figure 1).
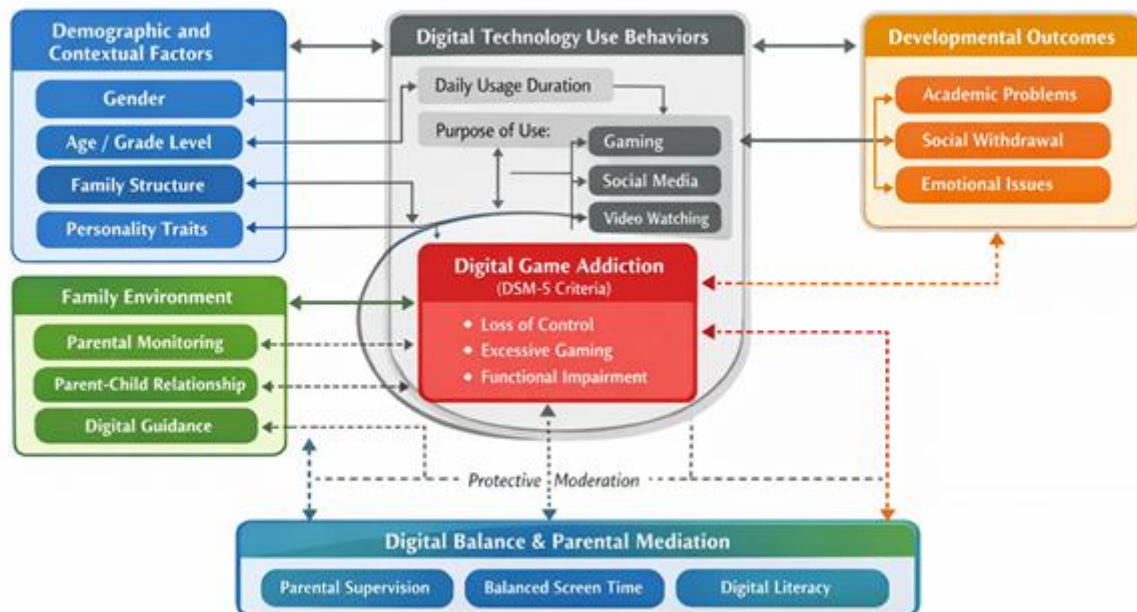
Figure 1. Conceptual model of digital game addiction in primary school children.

Figure 1 presents the conceptual framework guiding the present study. The model illustrates how demographic and contextual factors (gender, age/grade level, and family structure) influence children's digital technology use behaviors, including daily usage duration and purpose of use. These behaviors contribute to the development of digital game addiction, conceptualized in line with DSM-5 criteria (loss of control, excessive gaming, and functional impairment). The model further depicts the developmental outcomes associated with digital game addiction, such as academic problems, social withdrawal, and emotional difficulties, while emphasizing the protective and moderating role of digital balance and parental mediation.

METHOD

This study was conducted within the framework of a quantitative research approach, employing a *descriptive survey design*. The descriptive survey model is used to define an existing situation as it currently exists and to statistically reveal the relationships between variables (Karasar, 2020). In this context, the study examined the relationships among primary school students' digital gaming duration, usage habits, and levels of gaming addiction.

The research was carried out with students enrolled in the 3rd, 4th, and 5th grades of a private primary school in the Turkish Republic of Northern Cyprus (TRNC). Consistent with the research objectives, the study examined whether students' digital game addiction levels varied across different demographic variables. Data were analyzed using the Kruskal–Wallis test and Post Hoc techniques. These nonparametric methods were selected because the sample distribution was non-normal and the data were measured on an ordinal scale (Field, 2018). All statistical analyses were performed using SPSS 24.0 software.

Population and Sample
The population of the study consisted of 3rd-, 4th-, and 5th-grade students attending private primary schools in the TRNC during the 2023–2024 academic year (fall semester). Since reaching the entire population was not feasible, a convenience sampling method was employed. This method allows researchers to collect data from accessible and voluntary participants (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, & Demirel, 2021).

The sample included 150 students who voluntarily agreed to participate in the research. Prior to data collection, participants were informed about the purpose of the study, and informed consent was obtained on a voluntary basis. Data were collected through face-to-face questionnaires administered in classroom settings. During administration, the researcher and classroom teachers provided necessary explanations and ensured that the children understood the questions. The data collection process lasted approximately two weeks.

Data Collection Instruments

Personal Information Form: Developed by the researcher, this form was designed to identify students' demographic and socio-economic characteristics. It included questions regarding grade level, gender, age, parental cohabitation status, and daily technology usage time. Preliminary data collected through the form helped identify individual and environmental factors that may influence addiction levels. The primary aim of this form was to facilitate the interpretation of scores obtained from the digital game addiction scale and to support the examination of relationships among variables (Creswell & Creswell, 2018).

Computer Game Addiction Scale for Children: The principal measurement tool used in the study was the *Computer Game Addiction Scale for Children*, developed by Horzum, Ayas, and Çakır Balta (2008). The scale was designed to measure the level of digital game addiction among 3rd-, 4th-, and 5th-grade students. It consists of 21 positively worded items rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). No reverse-coded items are included, and higher scores indicate higher levels of digital game addiction. Factor analysis conducted during the original scale's development revealed a four-factor structure, and the overall reliability coefficient was reported as Cronbach's α = .86, indicating high internal consistency (Horzum et al., 2008; Tavşancıl, 2010). To test item discrimination, an independent-samples *t*-test was performed between the lower 27% and upper 27% groups, revealing significant differences for all items.

In the present study, the scale was administered in its original paper-and-pencil format. Each student completed the scale in approximately 15 minutes. The level of statistical significance was set at $p < .05$.

Data Collection Procedures

The data collection process was carried out during the fall semester of the 2023–2024 academic year. Permission was obtained from the school administration prior to implementation. Teachers and parents were informed about the purpose, scope, and ethical principles of the research. Parental consent forms were collected before obtaining data from students.

Throughout all stages of the research, participant confidentiality was maintained, and all data were used solely for scientific purposes. Questionnaires were administered in a quiet and focused classroom environment, with the researcher guiding participants to ensure comprehension. At the conclusion of the process, students received a brief digital awareness session, including informative guidance on healthy and balanced digital game use.

Data Analysis

Data analysis was performed using SPSS 24.0. Prior to statistical analysis, data accuracy and missing values were examined. The normality of distributions was tested using the Kolmogorov–Smirnov test, which indicated non-normality; thus, nonparametric statistical methods were employed.

The following analyses were conducted:

- Frequency and percentage distributions to describe participants' demographic characteristics;

- Kruskal–Wallis H tests to compare digital game addiction scores according to variables such as gender, grade level, and daily technology use;

- Post Hoc (Mann–Whitney U) tests to determine between-group differences.

The level of statistical significance was set at p < .05, and results were supported by relevant tables. Findings were interpreted in light of the existing literature. To ensure transparency and replicability of the research process, the methodological steps of the present study were systematically structured. The study followed a quantitative research approach based on a descriptive survey design, aiming to examine digital game addiction levels and technology use behaviors among primary school children. The overall methodological procedure, from defining the target population to the statistical analyses employed, is visually summarized in Figure 2.
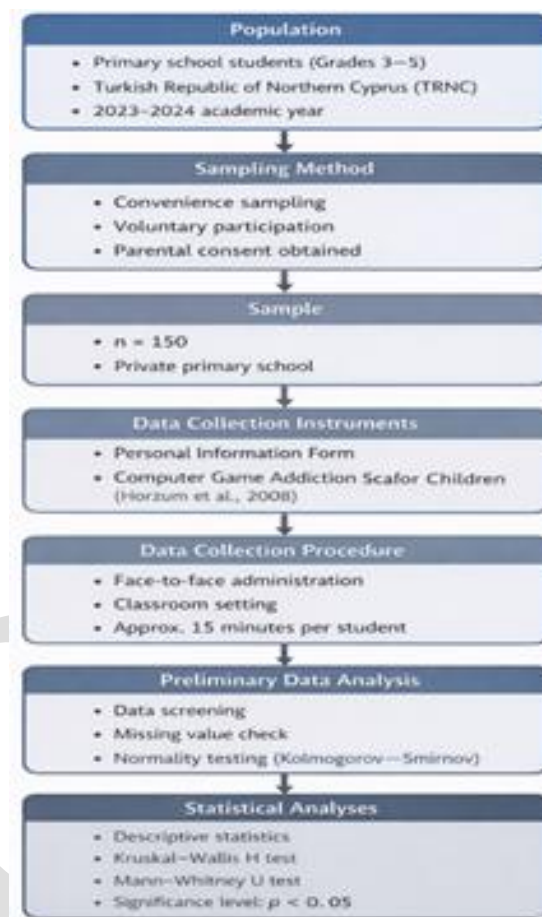

Figure 2. Methodological flowchart of the study.

As illustrated in Figure 2, the study population consisted of primary school students enrolled in Grades 3 to 5 in the Turkish Republic of Northern Cyprus during the 2023–2024 academic year. A convenience sampling method was employed due to accessibility considerations, and participation was based on voluntariness with parental consent obtained prior to data collection. Data were gathered through face-to-face administration of the Personal Information Form and the Computer Game Addiction Scale for Children in classroom settings. Preliminary data screening and normality testing indicated non-normal distribution, leading to the use of nonparametric statistical analyses.

Ethical Considerations

The research was conducted in strict adherence to the principles of voluntary participation, participant confidentiality, and informed consent, and data were used exclusively for scientific purposes. The study complied with the Scientific Research and Publication Ethics Directive of the Council of Higher Education (2020) and adhered to the ethical standards of the Ethics Committee of Girne American University.

RESULTS

Initially, descriptive analyses were conducted to provide an overview of participants' demographic and technological behavior profiles, including gender distribution, household composition, and average daily technology use. These findings offer a foundation for understanding the general tendencies of the sample and identifying patterns relevant to children's interaction with digital media.

Subsequently, nonparametric statistical analyses were applied to determine whether participants' digital engagement differed significantly depending on their purpose of technology use and duration of daily use. The Kruskal–Wallis test and post hoc comparisons were employed to explore potential variations in digital game addiction scores among groups. The results highlight the extent to which children's patterns of technology use are associated with differences in addiction levels, revealing important implications for understanding digital behavior in educational and developmental contexts.

Table 1 shows that among the 153 students participating in the study, 51% were female (n = 78) and 49% were male (n = 75). This nearly equal gender distribution indicates that the sample was well-balanced in terms of gender, thereby enhancing the generalizability of the findings and reducing the likelihood of gender-related bias.

Table 1. Gender distribution of participants.

Gender	f	%
Female	78	51.0
Male	75	49.0
Total	153	100.0

When the distribution of participants according to the individuals they live with was examined, it was found that the majority of students (79.7%) lived with both parents. The proportion of those living only with their mother was 12.4%, and those living only with their father constituted 7.8% of the sample. This indicates that most participants came from two-parent households, while single-parent families represented a smaller proportion.

Table 2. Individuals participants live with.

Living Situation	f	%
Living with mother	19	12.4
Living with both parents	122	79.7
Living with father	12	7.8
Total	153	100.0

Analysis of participants' daily technology use revealed that more than half of the sample (55.6%) used technological devices for 1–3 hours per day. About one-third (29.4%) reported 4–6 hours of use, which can be classified as moderate usage. A smaller portion (5.9%) used technology for 7–9 hours, while 9.2% reported using technological devices for more than 10 hours daily. This distribution suggests that while most students exhibit moderate use, a notable subgroup experiences prolonged screen exposure.

Table 3. Participants' daily technology use.

Daily Use Duration	f	%
1–3 hours	85	55.6
4–6 hours	45	29.4
7–9 hours	9	5.9
10 hours or more	14	9.2
Total	153	100.0

Regarding the purposes of technology use, the findings indicate that the most common activity was playing games (37.9%), suggesting that students primarily use digital devices for entertainment and recreational activities. This was followed by social media use (16.3%), watching movies or videos (14.4%), and doing homework (11.1%). Approximately one-fifth of participants (20.3%) reported using technology for multiple purposes simultaneously, reflecting a prevalent trend of multifunctional digital engagement among children.

As shown in Figure 3, digital game addiction scores increased progressively with longer daily technology use durations.
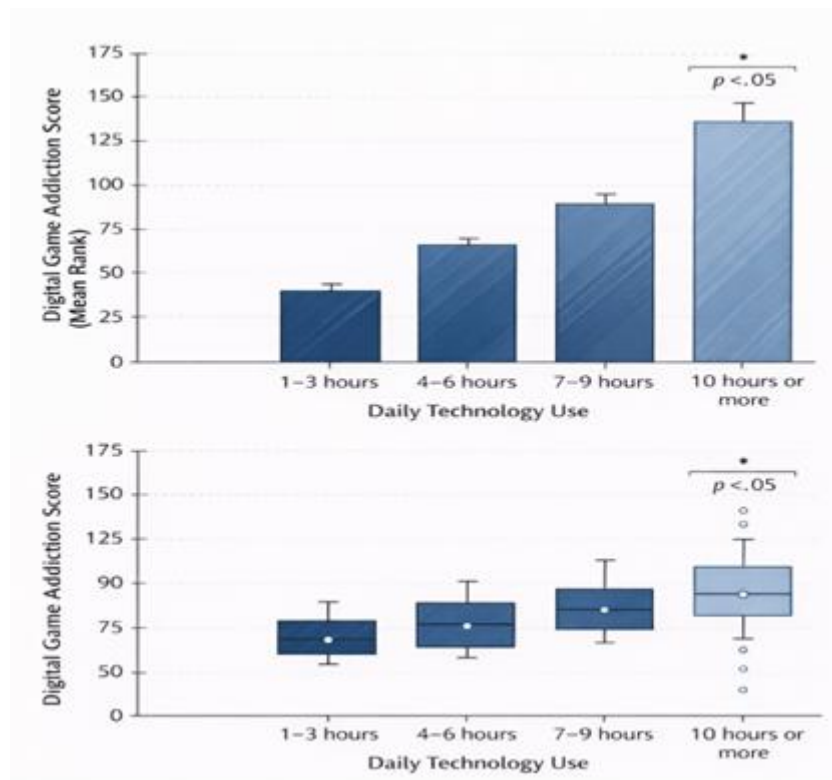

Figure 3. Digital game addiction scores by daily technology use duration.

Students who reported using technology for ten hours or more per day exhibited markedly higher addiction scores compared to those in lower usage groups. This visual pattern supports the statistical findings reported in Table 3.

Table 4. Participants' purposes of technology use.

Purpose of Use	f	%
Playing games	58	37.9
Doing homework	17	11.1
Using social media	25	16.3
Watching movies/videos	22	14.4
Other combinations	31	20.3
Total	153	100.0

Results from the Kruskal–Wallis test revealed significant differences among participants based on their purposes for using technological devices ($p < .05$). The highest mean rank values were observed in the groups "playing games" (96.12) and "game–social–film" (104.61), indicating that children predominantly engage with technology for entertainment-oriented activities. The lowest mean rank

belonged to the "doing homework" group (42.26), highlighting that educational use remains relatively limited compared to other digital activities.

Table 5. Kruskal–Wallis test results by purpose of technology use.

Purpose of Use	n	Mean Rank
Playing games	58	96.12
Doing homework	17	42.26
Using social media	25	71.60
Watching movies/videos	22	65.27
Game–social–film combination	9	104.61
Other	22	60.00

To further examine how the purpose of technology use relates to digital game addiction, addiction scores were compared across different usage categories. The distribution of digital game addiction scores according to the primary purpose of technology use is visually presented in Figure 4.
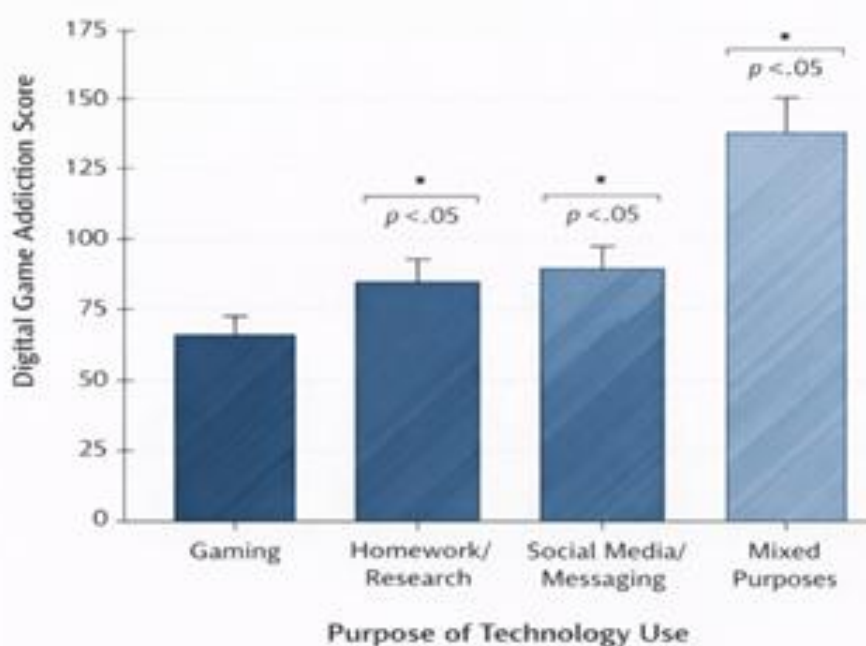

Figure 4. Distribution of digital game addiction scores by purpose of technology use.

As shown in Figure 4, students who primarily used technology for gaming exhibited higher digital game addiction scores compared to those who used technology mainly for homework or research purposes. Elevated addiction scores were also observed among students who reported mixed purposes of technology use, supporting the statistical findings reported in Table 5.

Post hoc analysis results demonstrated that the group using technology primarily for gaming scored significantly higher than all other groups ($p < .05$). In particular, there was a 19.35-point difference between gaming and homework groups, and a 19.02-point difference between gaming and game–homework–film groups. Likewise, gaming scored 8.82 points higher than the game–social category. These results underscore that digital technology is predominantly positioned as a source of entertainment among children.

Table 6. Post Hoc analysis results by purpose of technology use.

Comparison Groups	Mean Difference (I–J)	p
Gaming – Homework	19.35	.00*
Gaming – Game/Homework/Film	19.02	.00*
Gaming – Game/Social	8.82	.00*
Homework – Game/Social	-10.52	.01*

Reexamination of participants' daily technology use durations confirmed that more than half (55.6%) reported using technology for 1–3 hours per day, while nearly one-third (29.4%) reported 4–6 hours. A smaller subset (15.1%) indicated using devices for 7 hours or more. This pattern suggests a generally moderate level of engagement, though a specific subgroup exhibits prolonged use.

Table 7. Repeated distribution of daily technology use.

Daily Use Duration	f	%
1–3 hours	85	55.6
4–6 hours	45	29.4
7–9 hours	9	5.9
10 hours or more	14	9.2
Total	153	100.0

The post hoc results showed that higher daily technology use was associated with significantly elevated digital game addiction scores. Students who used technology for 10 hours or more per day scored markedly higher than all other groups ($p < .001$).

Table 8. Post Hoc analysis results by daily technology use duration.

Comparison Groups	Mean Difference (I–J)	p
1–3 hours – 4–6 hours	-7.88	.041*
1–3 hours – 10+ hours	-29.83	.000*
4–6 hours – 10+ hours	-21.94	.002*
7–9 hours – 10+ hours	-26.23	.032*

*$p < .05$

A moderate difference was found between those using technology for 1–3 hours and 4–6 hours, while those using it for 7 hours or more exhibited significantly higher addiction levels. These findings indicate that extended screen exposure intensifies the risk of addiction among primary school students.

DISCUSSION, CONCLUSION, and RECOMMENDATIONS

The present study investigated primary school students' digital gaming habits, durations of technology use, and addiction levels across various demographic variables.Overall, the findings indicate that most participants were moderate technology users, primarily employing digital tools for gaming, and that extended use significantly increased addiction levels. These results suggest that digital games play not only an entertainment role in children's lives today but also a central role in identity development, socialization, and emotional regulation (Griffiths, 2010; Kuss & Griffiths, 2017).

To provide an integrative overview of the study's main findings, the relationships among significant predictors, digital game addiction, and potential developmental implications are synthesized in Figure 5.
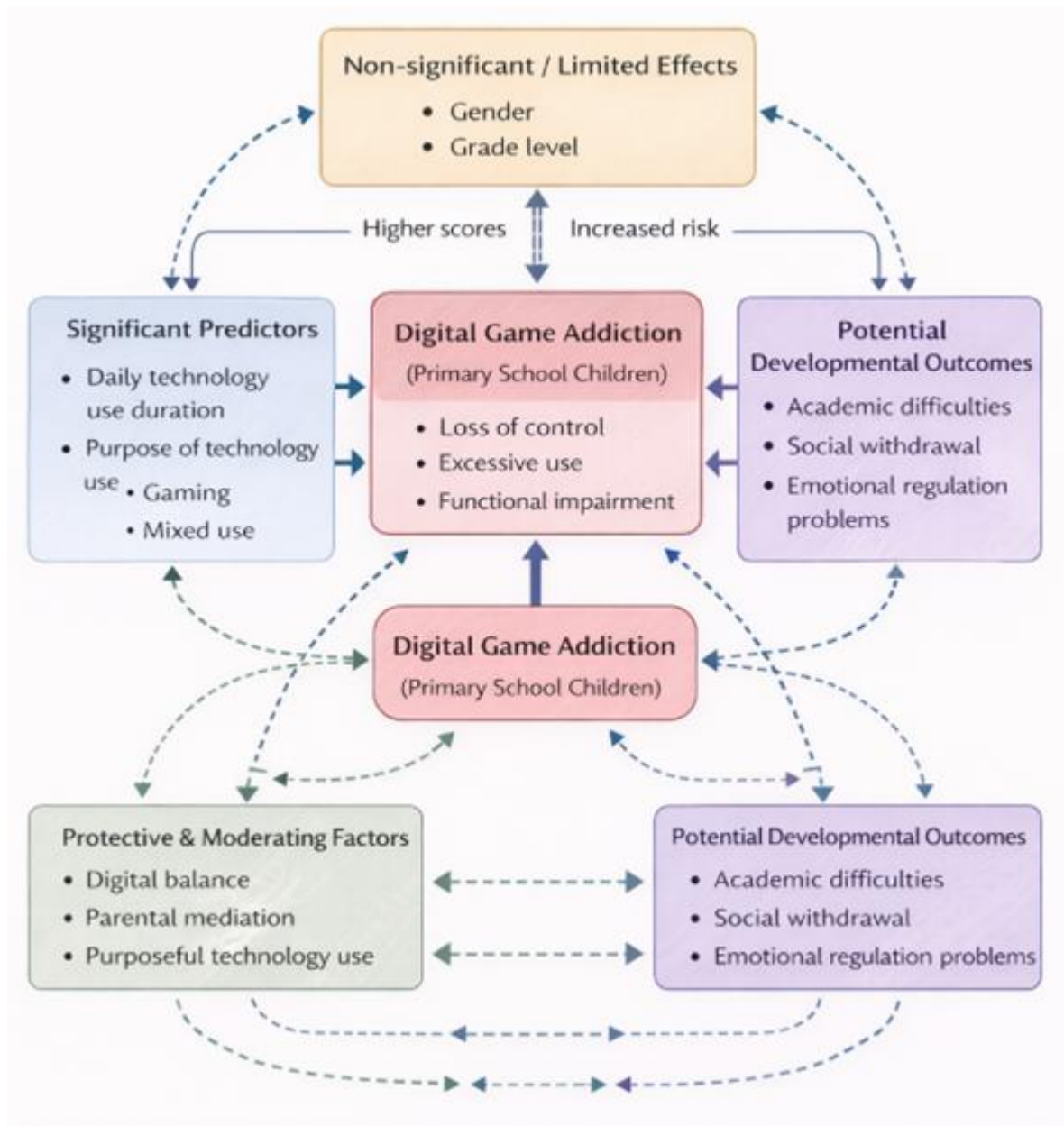
Figure 5. Snythesis of the main emprical findings related to the game addiction in primary school children.

As illustrated in Figure 5, daily technology use duration and the primary purpose of technology use emerged as the strongest predictors of digital game addiction among primary school children. In contrast, demographic variables such as gender and grade level demonstrated limited explanatory power. The synthesis further highlights the potential buffering role of digital balance and parental mediation, suggesting that structured and purposeful technology engagement may mitigate the risk of addictive behaviors.

The findings are consistent with previous studies conducted in Türkiye and the Turkish Republic of Northern Cyprus (TRNC). Horzum and Ayas (2008) emphasized that children perceive digital games not merely as a leisure activity but as a fundamental component of their daily lives. Similarly, Doğan Keskin and Aral (2021) reported that as children's gaming time increases, their academic and social adjustment decreases significantly. Aligning with existing literature, this study reinforces the

argument that game addiction extends beyond a leisure-time issue and constitutes a developmental risk factor.The gender distribution of the participants was balanced, with 51% female and 49% male students. A balanced sample is an important advantage in studies on digital game addiction. However, prior research indicates that attitudes toward gaming and play frequency often differ by gender (Griffiths, Davies, & Chappell, 2004; Kuss et al., 2013). Male students tend to prefer action, strategy, and racing games, whereas female students are more likely to engage with simulation, narrative, and socially interactive games (Gentile et al., 2017). Although the present study's sample was balanced, male participants demonstrated higher average gaming durations, consistent with the literature. Aral and Doğan Keskin (2020) found that boys are generally motivated by *competition and achievement*, while girls are more driven by *socialization and emotional sharing*. Such gender-based differences in gaming experiences may constitute distinct risk factors in the development of addiction, aligning with prior research indicating a higher tendency toward gaming addiction among males (Ko et al., 2005; Lemmens et al., 2015).

The majority of participants (79.7%) reported living with both parents, while 12.4% lived only with their mother and 7.8% only with their father. This finding highlights the critical role of family structure in shaping children's digital gaming behaviors. Family interaction directly influences the nature of children's engagement with digital content (Livingstone & Helsper, 2008). Studies have shown that low parental supervision and guidance are associated with significantly longer gaming durations (Nikken & Jansz, 2014). Similarly, the current study found that children living with both parents exhibited more balanced gaming habits compared to those from single-parent households. This supports the view that parental support and monitoring act as protective factors against digital addiction (Erden & Bulut, 2023). Additionally, research suggesting that children from single-parent families may turn to digital media as a coping mechanism (Valkenburg & Piotrowski, 2017) reinforces these findings.

A key finding of the study indicates that higher levels of daily technology use are associated with significantly increased addiction scores.More than half of the participants (55.6%) used technology for 1–3 hours per day, whereas 9.2% reported use exceeding 10 hours daily. This finding directly corresponds to the DSM-5 diagnostic criteria for "loss of control" and "excessive time spent gaming" (APA, 2013). Gentile and Anderson (2017) demonstrated that prolonged screen exposure among children is associated with attention problems, lower academic performance, and emotional regulation difficulties. Similarly, Horzum (2011) reported that increased gaming time correlates with decreased physical activity and weaker social relationships. Aligning with these studies, the current findings suggest that prolonged technology use undermines children's cognitive and behavioral self-regulation. In particular, usage of 10 hours or more per day represents a critical threshold at which the risk of addiction becomes pronounced.

Digital games have consequences that extend beyond addiction, encompassing multifaceted cognitive, emotional, and social outcomes. On the positive side, games can enhance skills such as problem solving, attention, and hand–eye coordination (Green & Bavelier, 2003). However, these benefits emerge only when gameplay is moderate and supervised. In contrast, excessive and uncontrolled gaming is linked to aggression, loneliness, and diminished academic motivation (Anderson et al., 2010; Kuss & Griffiths, 2017). The findings of this study show that children predominantly use digital games for entertainment and recreation rather than for learning or development. This indicates that children often perceive gaming as a means of *escape* or *gratification* rather than as a constructive learning tool. In school-aged children, the reward-based structure of games enhances dopamine release, reinforcing addictive tendencies (Weinstein & Lejoyeux, 2015). Therefore, balanced and pedagogically guided use of digital games—particularly through game-based learning models—is of critical importance.

The results further imply that digital games should be integrated consciously into educational environments. Game-based learning can be a powerful pedagogical approach to enhance student attention and motivation (Gee, 2007). Yet, for this potential to be realized effectively, teachers must

clearly define the pedagogical boundaries of digital gaming. Excessive gaming can increase cognitive load and cause distraction during learning (Przybylski et al., 2010). Psychologically, digital games also influence children's emotional regulation strategies. Children with gaming addiction tend to display higher levels of anxiety, loneliness, and impulsivity (Lemmens et al., 2015). Hence, school counselors play a key role in recognizing and intervening early in cases of digital addiction. Collaborative efforts among teachers, parents, and guidance counselors can form the basis of effective digital awareness and prevention programs.

This study was limited to students in grades 3–5 at a single private primary school in the TRNC, which constrains the generalizability of the findings. Additionally, because data were collected through self-report instruments, there is a possibility of bias arising from participants' self-perceptions. Future research should adopt mixed-method designs incorporating both quantitative and qualitative approaches to explore the cognitive, emotional, and behavioral dimensions of digital game addiction more comprehensively. Including variables such as parental education level, socioeconomic status, and digital literacy would further enhance explanatory power. Moreover, cross-cultural comparative studies could elucidate the sociocultural meanings children attribute to digital games (Karahisar, 2020).

In conclusion, this study revealed that digital gaming among primary school children is increasing and varies according to several demographic and behavioral factors. Most participants reported spending several hours daily on digital games, using technology primarily for entertainment, with prolonged use significantly elevating addiction risk. When used appropriately, digital games can serve as powerful tools that foster cognitive development, cooperation, and creativity. However, uncontrolled and purposeless use can adversely affect children's physical, psychological, and social well-being. Therefore, parents, teachers, and school counselors must cultivate high levels of digital awareness and prioritize teaching children the concept of digital balance. Educational policies should address the needs of digitally native generations by promoting *digital prudence* and *self-regulation skills*. School-based digital awareness programs developed within this framework should function as both preventive measures against addiction and as supports for game-based learning initiatives.

Recommendations

Future research should examine gender-based differences in greater depth through studies that ensure balanced representation of male and female participants. In particular, variations in students' attitudes toward technology, their usage motivations, and their preferences for digital games should be analyzed comprehensively. Such research can more clearly reveal the influence of gender as a sociocultural factor on the development of digital competencies.

The influence of family structure on technology-use habits should also be explored within different contextual variables. Beyond comparing single- and two-parent families, it would be valuable to investigate how children raised in extended family settings approach technology. In this regard, attention should be directed toward issues such as parental attitudes, levels of domestic digital supervision, and the ways in which family communication is shaped through technology.

Longitudinal studies examining the reflections of daily technology use on psychological well-being, academic achievement, and social interaction are recommended. In particular, potential outcomes of prolonged exposure to digital media—such as inattention, loneliness, social isolation, and addictive tendencies—should be addressed through multidimensional analyses. Experimental research comparing the use of technology for entertainment, educational, and communicative purposes may further clarify how different forms of digital engagement affect learning outcomes. Within this framework, the effects of game-based learning applications and social-media-based learning environments on students' motivation and academic performance could be compared.

Moreover, qualitative studies examining social media use, content production, and digital identity formation can offer valuable insights into how these processes affect individuals' self-perception and

interpersonal relationships. In this context, it would be worthwhile to explore the consistency between individuals' online interactions and their offline behaviors.

From the perspective of educational institutions and policymakers, developing national-level guidance policies on technology use is of critical importance. Such policies should support both students and teachers in using digital tools effectively and healthily. For teachers, in-service professional development programs aimed at strengthening digital pedagogical competencies should be designed. For families, awareness campaigns, parental guidance seminars, and school-family collaboration projects are recommended to help children maintain a balanced engagement with digital media. Models can also be developed to establish a healthy equilibrium among gaming, social media interaction, and educational technology use.

Finally, interdisciplinary research—integrating psychology, education, and communication sciences—should investigate the behavioral patterns, attentional processes, and social relationships of individuals exposed to technology for extended periods. Such studies would provide a stronger scientific foundation for the formulation of future educational policies, digital citizenship programs, and family guidance strategies, enabling a more comprehensive understanding of technology's individual and societal impacts.

Ethics and Conflict of Interest
Ethical approval was given for the research by the Girne American University Ethics Committee with the decision number 9/24-14 dated 17.05.2024. The research was conducted in strict adherence to the principles of voluntary participation, participant confidentiality, and informed consent, and data were used exclusively for scientific purposes. The study complied with the Scientific Research and Publication Ethics Directive of the Council of Higher Education (2020) and adhered to the ethical standards of the Ethics Committee of Girne American University. The author declares that they acted in accordance with ethical rules in all processes of the research. The author declares that they have no conflict of interest.

Data availability
The data that support the findings of this study are available on request from the corresponding author.

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