

## Research Article

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## The Relationship Between Digital Intelligence and Video Game Addiction in Kuwaiti Middle School Students

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**Abstract**

**Background/purpose.** This research aims to identify the relationship between digital intelligence and video game addiction among Middle school students, to identify gender differences in digital intelligence, and to reveal the digital intelligence skills that contribute most to predicting video game addiction.

**Materials/methods.** The sample comprised 300 male and female students from the ninth and tenth grades of secondary school in public schools in the State of Kuwait, aged between 14 and 15 years. A qualitative descriptive correlational approach was used, and the Digital Intelligence and Video Game Addiction Scale was administered to them. Some statistical analyses were conducted, such as Pearson's correlation coefficient, Cronbach's alpha coefficient, the T-test to identify the significance of differences between groups, and multiple regression analysis.

**Results.** The findings of this study showed a statistically significant negative correlation between students' scores on the digital intelligence scale and their scores on the video game addiction scale. It also showed statistically significant differences between males and females in some digital intelligence tasks, namely, management Screen time, cyberbullying management, critical thinking, digital footprint, and total score were significantly higher in males. Significant differences were also found in other digital intelligence tasks (digital emotional intelligence and privacy management) in females' favor. The study results also revealed that the combined effect of digital footprint, digital.

**Conclusion.** The study highlights the link between digital intelligence and video game addiction, identifies differences between males and females in digital intelligence skills, and the extent to which digital intelligence skills contribute to detecting video game addiction.



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## 1. Introduction

Digital intelligence represents the missing link necessary to achieve the desired benefits from modern technological applications, as well as to protect against falling victim to digital bullies. This makes preventative programs an urgent necessity to protect individuals exposed to risks and potential harm. This makes developing digital intelligence in school students of great importance in educational systems. Digital intelligence also contributes to helping students discover, evaluate, use, share, and create digital content, and develops what is known as computational thinking. This enables students to make positive and purposeful use of digital applications, enabling them to embody the characteristics of a digital citizen and enjoy the advantages of digital applications and their educational, social, and cultural benefits. (Al-Laithi, 2022).

Awareness of video game addiction is a vital step towards prevention and treatment, as digital intelligence is closely linked to video game addiction (Al-Ghamdi, 2024). In this context, several previous studies have emphasized the need to improve digital intelligence skills among school students. These include: Khalil and Ahmed's (2022) study, which emphasized the need to develop digital intelligence among students at all levels. Al-Laithi's (2022) study recommended the development of school activities to include digital intelligence skills. Jaber's (2022) study emphasized the importance of digital intelligence and the inclusion of its areas within basic education curricula. A study by Sathiya et al. (2021) recommended the need to inculcate digital intelligence skills among students. Studies by Farkhakh et al. (2020) and Al-Darmaki (2024) emphasized the negative impact of video game addiction on school students. Addiction contributes to the exacerbation of psychological, social, and educational problems, leading to a decline in academic performance and increased aggressive and withdrawn behavior. Therefore, it is imperative to focus on digital intelligence and the need to develop it among students in schools. Educational strategies and treatment programs should be adopted to reduce this addiction and promote positive interaction among these students with their surroundings.

Addiction to video games and the internet is a manifestation of personality disorders, which may represent a preparatory stage for the transition to a world of illness, disorders, problems, and complications. (Rahmani, 2014)

In this context, Al-Harbi (2014) concluded that the percentage of students who think about video games represents a significant 40%, while it also revealed that the percentage of students addicted to video games reached 28%. Khairat's study (2020) also showed that excessive use of video games can negatively impact students' social and emotional behaviors. Singh et al.'s study (2021) also confirmed the negative impact of excessive internet use on sleep and mood among university students.

Hijazi's (2024) and Abu Al-Saud's (2024) study concluded that school students suffer from a deficiency in digital intelligence skills and that the learning environment lacks activities to develop digital intelligence skills.

Although most previous studies have focused on the importance and role of digital intelligence in the digital age, and on helping children protect themselves from the dangers of technology and mitigate its negative effects, there is still a relative dearth of in-depth studies linking digital intelligence to video game addiction.

Although most previous studies have focused on the importance and role of digital intelligence in the digital age, and helping children protect themselves from the dangers of technology and reduce its negative effects, there is still a relative scarcity of in-depth studies that link digital intelligence to addiction to electronic games. Therefore, this research aims to: identify the relationship between digital intelligence and video game addiction among Middle school students in the State of Kuwait,

to identify gender differences in digital intelligence, and to reveal the digital intelligence skills that contribute most to predicting video game addiction

## 2. Literature Review

### 2.1. Digital Intelligence

Digital intelligence is defined as the sum of the technical, social, and mental competencies necessary to enable students with learning disabilities to use digital media and technology in safe ways and harness these innovations to improve their learning.

It also includes the ability to employ these innovations to achieve creativity and transform their ideas into reality. In other words, it is not just about the ability to use digital technology, but also about knowing what to use these technological innovations for, why, and when to use them effectively (Hijazi, 2024, p. 21). Abu Al-Saud (2024, p. 63) defined it as the set of skills necessary for school students to use digital applications positively and safely, enabling them to adapt to the demands of digital life.

Park (2019, p. 12) stated that digital intelligence is a set of technical, cognitive, social, and emotional competencies based on ethical values that enable individuals to meet the challenges of digital life and adapt to its demands.

Al-Dahshan (2019, p. 63) states that the levels of digital intelligence include: (1) digital citizenship: the ability to use technology and digital media in safe, responsible, and ethical ways, (2) digital creativity: the ability to become part of the digital ecosystem and create new knowledge, technologies, and content to transform ideas into reality, (3) digital competitiveness: the ability to solve global challenges, innovate, and create new opportunities in the digital economy by stimulating entrepreneurship, jobs, growth, and impact.

Secondary education is one of the optimal educational stages for developing digital intelligence. Therefore, educational content must be carefully selected, as the adolescent mind is highly sensitive and immediately applies acquired knowledge and attitudes. (Dostál et al., 2017)

The Digital Intelligence Institute of Singapore (DQ Institute, 2019), Park (2016), and Al-Rajaji (2015, p. 92) referred to eight components or digital skills: digital footprint, privacy management, screen time management, cyberbullying management, critical thinking, cybersecurity management, digital empathy, and digital citizen hobby.

Improving students' digital intelligence helps treat digital addiction and misuse of computers. Therefore, digital intelligence skills must be integrated into the education system's curricula, using the term "digital education" (Abu Al-Saud, 2024).

In this context, we find many previous studies calling for the need to focus on digital intelligence and develop its skills among school students. Among the most prominent of these studies is Abdel-Wahab's (2021) study, which aimed to develop a social learning environment based on content presentation methods to develop digital intelligence skills. It is recommended that when designing an e-learning environment, learners should include the digital intelligence skills necessary for them, in light of modern requirements.

Manasia et al.'s (2018) study also aimed to identify schools' readiness to implement the concept of digital intelligence and to examine the impact of introducing the concept of digital intelligence in education. The results of the "Al-Ranini" study (2023) reached a number of conclusions, the most important of which are: Digital intelligence skills are a basic requirement in this era, and students must be empowered with them. Educational institutions and relevant entities can also contribute to providing programs to develop digital intelligence skills for students in schools. The study also

concluded that digital intelligence skills can be introduced in multiple ways, whether through curricula or through activities in schools.

## **2.2. Electronic Game Addiction**

Electronic game addiction is defined as a behavioral pattern that leads to a persistent interest in gaming at the expense of necessary tasks and social relationships, characterized by a loss of control and a severe shift in the game at the expense of daily activities. (Al-Darmaki, 2024,p305).

Shelley (2024, p. 5) defined electronic game addiction as a behavioral addiction characterized by excessive and compulsive gaming, leading to social isolation, poor academic or work performance, and physical health problems. The American Psychiatric Association (APA) defines it in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) as: "persistent and recurrent use of the Internet to engage in gaming, often with other individuals, resulting in clinically significant impairment or distress." The APA establishes nine criteria for diagnosing an individual with Internet gaming disorder. An individual can be diagnosed if they meet five or more of these criteria for a period of at least 12 months (2013, APA).

The World Health Organization (WHO) has identified three criteria for video game addiction: impaired control over gaming, prioritizing gaming over other life activities and tasks, and continuing to play despite negative consequences (WHO, 2022).

Perhaps the most well-known criteria for video game addiction is the American Psychiatric Association (APA) criteria, which outlines nine criteria for video game addiction disorder. It states that when an individual meets five or more of these nine criteria over a 12-month period, they are diagnosed with the disorder.

The behavioral theory views video game addiction as an acquired behavior that can be changed and is influenced by the principles of stimulus, response, reinforcement, and conditioning. The behavioral approach explains gaming as a combination of stimuli and responses, meaning that students master the game through repetition, practice, and reinforcement, which affects their skill level. Meanwhile, those with a cognitive approach believe that video game addiction is due to incorrect perceptions and a cognitive structure that makes the internet the center of their lives, replacing it with reality. Those with an integrative approach explain video game addiction as the result of the interaction of a number of personal, affective, social, and environmental factors (Mukhtar, 2023; Abdel-Fadil et al., 2024).

Video game addiction has become a significant issue in our digital age, as this phenomenon impacts many psychological and educational aspects of students and adolescents. (Sun et al., 2023) In this context, Farchakh et al. (2020) conducted a study aimed at identifying the relationship between video game addiction and memory, attention, and learning skills among a sample of Lebanese school students. The study sample consisted of 566 school students aged between 9 and 13 years. The results of the study indicated that high video game addiction was significantly associated with poor memory, problem-solving, basic reading skills, and written expression skills among students.

The study by Nisha Singh et al. (2021) also aimed to identify the relationship between excessive internet use, sleep, and mood in a study sample consisting of 605 university students in India, using a set of questionnaires. The results of the study indicated a positive relationship between excessive internet use and mood disorders. On the other hand, the study by Al-Nafri (2023) aimed to identify the reality of playing video games among a sample of 317 students.

The study reached a set of results, the most prominent of which are that the positive effects of video games on academic achievement include the acquisition of new skills and information, and increased intellectual and creative levels.

The study also revealed the most significant negative effects, which were represented by the student's neglect of schoolwork, poor attention and concentration, and decreased academic achievement.

Mukhtar's (2023) study identified video game addiction and its relationship to some psychological disorders among students, as well as differences in psychological disorders based on levels of gaming addiction and gender. The study sample consisted of 61 students, and the results revealed a direct correlation between video game addiction and psychological disorders among middle school students. It also revealed differences in psychological disorders based on students' level of addiction, and no differences in psychological disorders among game addicts based on gender. Abdel-Fadil et al.'s (2024) study aimed to identify the relationship between addiction to violent video games and aggressive behavior among second-cycle basic education students, in addition to the difference between males and females in addiction to violent video games. The sample consisted of 205 male and female students aged 13-15 years, from public and private schools. The results demonstrated a statistically significant correlation between addiction to violent video games and aggressive behavior in all its dimensions.

### ***2.3. Hypotheses of the Study***

The present study digital intelligence and video game addiction among middle school students in the State of Kuwait and proposes the following research hypotheses:

H1. There is a statistically significant relationship between the sample members' scores on the digital intelligence scale and their scores on the electronic game addiction scale.

H2. There are statistically significant differences between males and females in the digital intelligence scale and its skills.

H3. The overall score on the Digital Intelligence Scale contributes to predicting video game addiction among sample members.

## **3. Methodology**

### ***3.1. Research Design***

Our study employed a qualitative descriptive correlational approach method, particularly suitable for research that follows the nature of the relationship between the study variables, the differences between males and females in gender variables, and the prediction of video game addiction through digital intelligence.

### ***3.2. Research Participants***

The research participant pool consisted of 300 male and female Middle school students in public schools in the State of Kuwait, comprising 150 males and 150 females, aged between 14 and 15 years, with a mean age of 14.3 and a standard deviation of 0.852. To verify the psychometric requirements of the study tools, the tools were administered to 35 male and female secondary school students, a sample similar in characteristics to the primary sample.

### ***3.3. Data Collection Instruments***

#### ***3.3.1. Digital Intelligence Scale***

Digital Intelligence Scale was prepared by Ahmed Al-Laithi (2022), the researcher adapted it in its original form to the Kuwaiti context. It consists of (50) statements directed at secondary school

students aged 14-15 years, to measure the components and skills of digital intelligence, represented by the following dimensions: screen time management, digital footprint, cyberbullying management, privacy management, critical thinking, and digital emotional intelligence. The scale items include three responses: (rarely, sometimes, always). The student is given one mark for responding "rarely", two marks for responding "sometimes", and three marks for responding "always". The highest score for the test is 150, and the lowest score is 50. The scale developer in its original version verified the reliability and validity of the scale, as the internal consistency coefficient ranged from 0.85, while the re-application reliability reached 0.72. In the current study, the researcher verified the reliability and validity of the scale using Cronbach's alpha for the scale dimensions, which ranged between 0.73 and 0.86, while the correlation coefficient of concurrent validity reached 0.56 between the scale used in this study and the scale (Al-Faqi & Al-Hawari, 2021).

### **3.3.2. The Electronic Games Addiction Scale (EGS)**

This scale was prepared by Yilmaz et al. (2017) and translated by Abdel Halim et al. (2023). The scale consists of (21) statements directed at high school students to measure electronic game addiction, which is represented by the following dimensions: self-control, reinforcement, problems, and participation. The answers to the scale items include five responses: (never, rarely, sometimes, usually, always). The student is given one point for responding with "never", (two points) for responding with "rarely", (three points) for responding with "sometimes", (four points) for responding with "usually", and (five points) for responding with "always". The highest score for the test is 105, and the lowest score is 21. The author of the current study verified the stability and validity of the scale through Cronbach's alpha for the scale dimensions, which ranged between 0.66 and 0.82, while the correlation coefficient of concurrent validity reached 0.49 between the scale used in this study and the scale (Abdul Rahim, 2023).

### **3.4. Application Procedures**

The research procedures were conducted according to field procedures such as: preparing the research criteria and obtaining approval to facilitate the implementation task from the principals of Middle schools in the State of Kuwait, as well as the approval of the students, then visiting the schools to get to know them and meeting with the principals to determine the appropriate times for implementation and explaining the objectives of the study. The research scales were then distributed to the selected sample members, with the objectives of the study explained to the students, and confirmation that the answers would be used only for scientific research purposes and that they would be treated with complete confidentiality. After that, the scales were collected from the students, and the data were statistically analyzed and processed, and then the results were reached and interpreted.

### **3.5. Analyzing Data**

To verify the validity of the study's hypotheses, some statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS).

Pearson's correlation coefficient was used to reveal the nature of the association between the study variables, Cronbach's alpha coefficient to verify the stability of the scales used, the "T" test to identify the significance of the differences between the male and female groups, and multiple regression analysis to reveal the extent to which digital intelligence contributes to predicting electronic game addiction.

## **4. Results**

As shown in Table 1. The results indicate the presence of a significant negative correlation between the skills of the Digital Intelligence Scale and the Electronic Game Addiction Scale. Looking

at the total score of the Digital Intelligence Scale and the Electronic Game Addiction Scale, a significant negative correlation of -0.490 was also found between them. This means that the higher the digital intelligence, the lower the addiction to electronic games in the study sample, and vice versa.

**Table 1.** Correlation Coefficients Between Digital Intelligence Skills and the Total Score on the Electronic Game Addiction Scale.

| Correlations                   | Video Game Addiction Scale |
|--------------------------------|----------------------------|
| Digital Intelligence Skills    |                            |
| Screen Time Management         | - 0.521**                  |
| Digital Footprint              | - 0.471**                  |
| Privacy Management             | - .0489**                  |
| Cyberbullying Management       | - .0581**                  |
| Critical Thinking              | - 0.604**                  |
| Digital Emotional Intelligence | - 0.517**                  |
| Overall Score                  | - 0.490**                  |

**\*\* Significant at the  $p < 0.01$  level (2-tailed).**

As shown in Table 2, there are statistically significant differences between males and females in screen time management, cyberbullying management, critical thinking, digital footprint, and the total scale score, favoring males. Significant differences were also found in both digital emotional intelligence and privacy management, favoring females.

**Table 2.** Mean Scores, Standard Deviations, and T-test Values of Males and Females in Dimensions of Digital Intelligence

| Tests                              | Males(n=150) |              | Females(n=150) |              | T      |
|------------------------------------|--------------|--------------|----------------|--------------|--------|
|                                    | Mean         | Std.Devation | Mean           | Std.Devation |        |
| (1) Screen Time Management         | 4.4          | 17.3         | 4.1            | 13.9         | 4.21** |
| (2) Digital Footprint              | 4.6          | 15.5         | 4.6            | 12.7         | 3.82** |
| (3) Privacy Management             | 4.2          | 7.6          | 3.2            | 10.9         | 3.23** |
| (4) Cyberbullying Management       | 3.1          | 21.9         | 4.9            | 19.3         | 2.23*  |
| (5) Critical Thinking              | 4.1          | 14.8         | 3.7            | 11.6         | 3.35** |
| (6) Digital Emotional Intelligence | 5.2          | 14.5         | 3.4            | 16.9         | 2.21*  |
| (7) Overall Score                  | 17.8         | 90.2         | 19.8           | 84.8         | 2.57** |

**\*\* Significant at the  $p < 0.01$  level (2-tailed).**

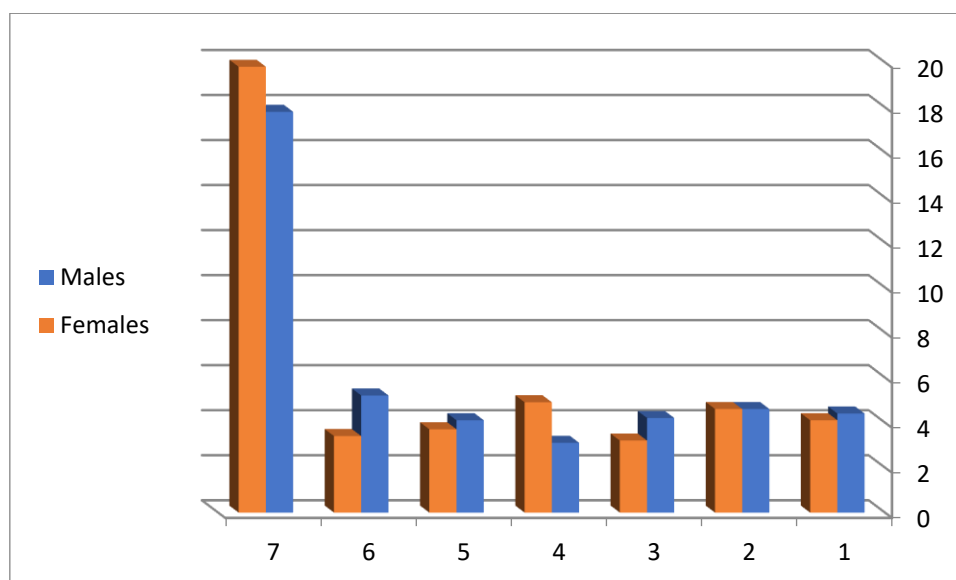


**Figure 1.** Graphic Representation of Mean Scores of Males and Females in Dimensions of Digital Intelligence.

As shown in Table 3, according to the stepwise multiple regression analysis of video game addiction among the study sample, it was found that the digital footprint component, digital emotional intelligence, and screen time management had a strong, effective, and statistically significant impact on predicting video game addiction among the study sample, and that they together explained (49%) of the total variance in the video game addiction scale scores among the study sample, indicating their ability to predict performance in predicting video game addiction among secondary school students in the State of Kuwait.

**Table 3.** Stepwise Multiple Regression Analysis of Video Game Addiction Among the Study Sample

| Model                          | B       | R Square | F       | Beta    | T      |
|--------------------------------|---------|----------|---------|---------|--------|
| Digital Footprint              | - 0.779 |          |         | - 0.521 | 3.23** |
| Digital Emotional Intelligence | - 1.196 | 0.492    | 82.75** | - 0.521 | 5.04** |
| Screen Time Management         | - 0.935 |          |         | - 0.521 | 4.34** |
| Constant                       |         |          | 137.73  |         |        |

\*\* Significant at the  $p < 0.01$  level (2-tailed).

## 5. Discussion

### 5.1. Negative Relationship between Digital Intelligence and Video Game Addiction Among High School Students

This relationship can be explained by the fact that students with high levels of digital intelligence are more capable of using technology consciously and responsibly. This awareness can help them better manage their time while in front of screens, thus reducing the risks or effects of video game addiction. This was confirmed by the results of a study (Chang & Chengfu, 2019), which aimed to examine the relationship between internet addiction and time management skills.

The results of the study showed a statistically significant negative relationship between internet addiction and time management skills. In this context, a study (Sathiya et al., 2021) recommended the acquisition of digital intelligence skills among 21st-century learners. A study (Solovieva et al.,

2020) supported the development of digital intelligence, explaining that it will become an essential characteristic of individuals in the digital age. A study (Dostál et al., 2017) confirmed that digital intelligence is a concept that meets the needs of the current and future era. Al-Laithi's (2022) study also acknowledged the role of developing digital intelligence skills in reducing online risks among secondary school students. Hutt et al.'s (2017) study also concluded that students' possession of the digital skills included in digital intelligence plays a significant role in reducing online risks.

### ***5.2. Differences between Males and Females in Digital Intelligence***

Statistically significant differences between males and females in screen time management, cyberbullying management, critical thinking, digital footprint, and the total scale score, favoring males. Significant differences were also found in both digital emotional intelligence and privacy management, favoring females. This hypothesis's results are consistent with the findings of Jalal (2024) and Ismail's (2024) study, which indicated statistically significant differences in digital intelligence attributed to gender (males and females), favoring males. The results of this hypothesis also differ from the results of Ibrahim's (2022) and Al-Qarni's (2022) study. Which concluded that there are no differences in digital intelligence attributable to the gender variable (males and females), and the superiority of males in digital intelligence over females is due to managing screen time, managing cyberbullying, critical thinking, digital footprint, and the total score of the scale. Because they are more open to virtual reality, more likely to use it, and more likely to be inclined towards it, because they can browse the internet without restrictions or strict censorship, and they may like to visit websites that deal with some ideas that females avoid, such as political issues and issues related to physical or sexual violence, which do not attract their attention, unlike males who browse all websites and discuss all issues with different orientations, which makes them more digitally competent and digitally communicative. Meanwhile, the existence of significant differences in both digital emotional intelligence and privacy management in favor of females can be explained by the fact that females may have different tendencies in traditional communication rather than digital communication with friends and acquaintances, as they prefer direct conversation on various topics (Ismail, 2024). Females also do not have the ability to adapt to the requirements of digital life and face its challenges, nor are they able to manage and control their digital identity appropriately and use digital devices to achieve a balance between their presence on the internet and in real life (Ibrahim, 2022).

### ***5.3. The Digital Intelligence Scale Contributes to Predicting Video Game Addiction***

Reveal this hypothesis, the ability of some digital intelligence skills to statistically significantly predict video game addiction among high school students. This is attributed to students' ability to use digital devices, media, and social media efficiently in light of the digital transformation and reliance on technological innovations in all aspects of their lives. This is consistent with the results of a study by Bekor Çar et al. (2022), which indicated that students' prolonged exposure to technology negatively impacts their digital awareness, possibly related to attempting to portray themselves in digital games or performing activities in a digital environment that they cannot perform in real life. Similarly, a study by Winnie et al. (2022) showed that adolescent students with higher digital proficiency were less likely to develop video game addiction. Gharib's study (2023) confirmed this, concluding that video game addiction can be predicted through time management skills, which is one of the digital intelligence skills.

## **6. Conclusion**

The preceding analysis and discussion show that the higher the digital intelligence, the lower the addiction to electronic games in the study sample, and vice versa. High school students in the State of Kuwait, especially males, also suffered from superiority in the use of some digital intelligence skills, such as managing screen time, managing cyberbullying, critical thinking, and digital footprint, While

females outperformed males in the use of digital emotional intelligence and privacy management, all of this demonstrates and confirms what the results of the third hypothesis indicated regarding the ability of some digital intelligence skills, such as digital footprint, digital emotional intelligence, and screen time management, to predict video game addiction.

In general, Digital intelligence and video game addiction have a complex, sometimes contradictory, relationship. While some aspects of digital game use can improve certain cognitive skills, excessive play is linked to addiction, which can negatively impact cognitive functions, including executive functions like impulse control. For this, digital addiction should be closely monitored in terms of existing comorbidities

## 7. Suggestion

This research presents a number of recommendations such as: Highlight the importance of digital intelligence as a necessary personal skill for students, as it provides them with a range of benefits, starting with providing protection and privacy, Develop school activities and include activities related to digital intelligence skills, The need to leverage the results of future research to develop evidence-based treatment protocols that integrate digital intelligence development strategies into the treatment of video game addiction in students, It is necessary to intensify research aimed at understanding the relationship between video game addiction and its physiological effects on brain function, Implement guidance programs to reduce the risks of video game addiction in students.

## Declarations

**Author Contributions.** (Shaimaa Almutairi: Introduction, literature review, procedure, data analysis, discussion, conclusions, translation. AISHA ALAZEMI: methodology, abstract, data analysis, results, suggestions, review, and writing. All authors have read and approved the published version of the article.)

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