The Psycho-Educational Effects of Digital Games on Learners:
Between Enhancing Attention and Digital Games Addiction
A Descriptive-Analytical Study

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Abstract

The study aims to uncover the psycho-educational effects of digital games in the virtual world on learners, focusing on two aspects. The first concerns attention efficiency, while the second aims to determine the prevalence of engagement with digital games among learners. More precisely, the study seeks to clarify whether engagement with digital games is merely casual or reaches the level of addiction. Additionally, it aims to explore the nature of the psycho-educational effects of digital games on attentional capacity. Do they contribute to its enhancement and strengthening, or do they, conversely, lead to a decline in effectiveness?

To achieve this goal, the researcher adopted a descriptive-analytical approach, utilizing a Likert scale questionnaire (electronic). The questionnaire included items distributed across two axes: the first focused on digital games, constructed based on the MICA scale, while the second addressed attention flow, relying on the Mustafa Al-Ziyat attention battery, as for the study sample, it consisted of 100 participants, including 50 males and 50 females, all at the second-year level of the bachelor's degree.

The research results yielded several conclusions, notably that digital games in the virtual world have a negative impact on attention flow. Furthermore, the majority of the surveyed sample expressed spending between four to six hours daily playing digital games.

Keywords

Psycho-educational effects, Digital games, learner, learning, Attention, Digital gaming addiction.

Introduction

Certainly, the world today is undergoing significant qualitative changes both on a general level and concerning technological and digital aspects. The impact of these means on various aspects of life, particularly in the educational realm, has become evident, affecting learners' cognitive and intellectual competencies as well as their social interactions. This has prompted a group of educational researchers to investigate both the strengths and weaknesses, the negative and positive effects that digital tools have on contemporary school life.

The issue has gained utmost importance, especially as the influence of digital games on educational and psychological aspects has transcended mere impact to the extent of children adopting abnormal and dangerous behaviors. This is exemplified by the case of a child from Safi City who killed his mother simply because she refused to provide him with money for internet recharge to engage with his peers in playing the game FREE FIRE.

Furthermore, addressing the psycho-educational effects of digital games on learners becomes imperative as today's learners navigate different social conditions compared to the past, where physical interactions governed. The shift towards a digital society draws individuals into a technological world, prompting them to gradually immerse themselves in its intricacies.

Expanding on the aforementioned, the significance of the topic becomes even more apparent, given that the current educational reality is moving towards adopting digital technologies as alternative or supportive means for traditional learning techniques. Improper use of these technologies by students may have a negative rather than positive impact on their academic performance, especially for those students who spend hours playing digital and video games.

In conclusion, digital games hold considerable weight and have found a place in the field of education in the Kingdom of Morocco, as will be highlighted in the later field results of the research. The research aims to shed light on the psycho-educational effects of digital games on learners, focusing on three elements. The first element is attention flow, considering it a fundamental cognitive process in learning and academic achievement. Any negative impact on this competence will inevitably affect the learner's cognitive learning and comprehension abilities. The second element is dedicated to understanding the prevalence of learners' engagement with digital games. More precisely, the research seeks to determine whether learners' engagement with digital games reaches the level of addiction or remains casual use.

The Importance of Research

The topic of this study holds significant epistemic importance, serving as the primary motivation behind the researcher's choice to delve into the psycho-educational effects of digital games on learners. Consequently, the research's significance can be outlined as follows:

- **The theoretical significance**

The theoretical importance of the research emerges from the urgent need and significance that the subject has gained, especially in recent times. Digital games have pervaded the lives of youth and learners, and their impact has extended to the extent of leading some children to fall victim to deviant behaviors, as previously mentioned in the case of the child from Safi City. Furthermore, digital games now serve various purposes ranging from entertainment and fun to education and learning, in addition to other profit-driven commercial uses.

What adds special theoretical importance to the subject under study is the conflicting views within the scientific community regarding the psycho-educational effects of digital games on learners. The first perspective acknowledges the negative effects of digital games, manifested in the susceptibility of learners to behavioral addiction, feelings of sadness and isolation, and an impact on academic performance. In contrast, the second perspective, supported by evidence, asserts that digital games have positive effects, such as enhancing learners' visual perception, strengthening cognitive abilities for external stimuli, and improving attention, memory, and other cognitive functions. Through this divergence, it becomes apparent that the topic carries a unique theoretical importance that can be further explored by delving into its field significance.

- **The field significance**

The field significance of the research primarily stems from the experimental examination of various questionable hypotheses related to the topic of digital games. This research serves as the initial diagnosis of the current situation regarding digital games and addiction to them, especially given the scarcity of national studies addressing the psychotropic effects of digital games on learners, with only a few shining exceptions. The field significance of the research becomes evident in its potential to utilize its findings in preparing a guidance manual for teachers, parents, and learners, as well as in formulating recommendations to contribute to proper guidance for the use of digital games in the educational field, particularly in Morocco.

The outcomes of the exploratory research strongly prompt us to rethink our approach to digital games. They are not merely entertainment mechanisms but extend beyond that, reaching addiction and influencing learner behavior in various aspects, as will be elucidated further through a review of previous studies.

Research Problem

Without a doubt, the widespread use of communication and media, in general, and digital games today, is akin to a fire that has engulfed everything unexpectedly. In the context of this cognitive technological revolution, digital games have gradually asserted their place, even in their relationship with the field of education and learning.

What is even more significant is their deep impact and prevalence. Most studies indicate that they have become an indispensable pillar for the overwhelming majority of youth and learners, regardless of their ages and backgrounds. It is rare to find a household today without the sound

of games like FREE FIRE and other popular ones among the youth and learners (Kinnunen et al., 2016). Moreover, this illustrates the depth of this behavior, which undoubtedly goes beyond mere enjoyment and time-wasting to reach another level, such as falling into the trap of addiction, social isolation, and negatively affecting learners' academic achievement.

What truly poses a real dilemma is a study by Shu-Min Tsai and others, which revealed that individuals spend significant amounts of time playing electronic games, equal to the time spent on various life activities. When an individual reaches the age of twenty-one, they may spend at least ten thousand hours engaging in electronic and digital games. These extended periods spent on gaming can lead to Internet Gaming Disorder (IGD) and addiction (Tsai et al., 2020).

The crucial point here is the question that arises about the effects of these games. They are a double-edged sword, where some see them as only reflecting negative aspects, while others acknowledge their positive aspects. For youth and learners, playing games is an expression of social, psychological, and physical needs that help them resume their daily social activities and excel in them. These games have advantages related to youth thinking, and imagination, enhancing cognitive abilities, attention, memory skills, and social interaction. However, these positives cannot overshadow the negatives and risks, as studies have identified psychological risks resulting from engagement in these games, including mental health issues and cognitive performance decline (Subrahmanyam & Renukarya, 2015).

Returning to the impact of these games on attention flow, it is affirmed that any impact, whether positive or negative, will undoubtedly affect an individual's cognitive and educational performance. Attention plays a fundamental role in understanding meaning, comprehension, and academic achievement.

In summary, considering all that has been mentioned, we can acknowledge that the current Moroccan society, amid its openness to the digital knowledge society, poses a question about engagement with these digital means. This issue should be addressed and analyzed, especially in its relationship with fundamental processes in learners' lives, such as attention, academic achievement, and the prevalence of engagement. The mentioned effects, which can lead to the loss of control and the inability to resist the desire for engagement, may force us to admit that we are dealing with an addictive problem, much like other types of addictions. This research problem branches led to hypotheses that can be approached as follows:

Hypotheses of the Research

H1. We assume that the engagement with digital games by learners negatively affects the attention process.

H2. We assume that the engagement with digital games by learners reaches the level of addiction.

H3. We hypothesize that combat-oriented games like FREE FIRE and PUBG are the most widespread among learners.

A conceptual framework for the research

- **Digital games**

Digital games are rapidly becoming an important tool for improving health behaviors and supporting the delivery of care and education. While definitions vary, key components of games include goals, rules, challenges, and interaction. In addition, games, unlike work, are designed to be "fun". Digital games can be used to educate, entertain, and motivate participants by delivering highly engaging content, enhancing the degree and depth of participant interaction, and increasing learning opportunities (Hightow-Weidman et al., 2017).

As they are often operated on modern digital devices such as computers, smartphones, and televisions, as well as some dedicated gaming consoles like the PlayStation, digital games are commonly used for entertainment purposes and enjoyment among players (Calleja, 2007). In the context of this research, it refers procedurally to all games that are used and accessed digitally or electronically, including those on smartphones, computers, and devices specifically designed for gaming, such as the PlayStation and similar gaming consoles.

- **Digital gaming addiction or (IGD)**

Digital gaming addiction can be defined as a behavioral disorder characterized by continuous and repetitive engagement in digital gaming activities. This addiction is fueled by the increasing prevalence of digital games, facilitated by advancements in gaming technology and the emergence of gaming platforms like computers and game consoles. Individuals affected by digital gaming addiction exhibit symptoms such as an escalating frequency and duration of gaming, impaired control over gaming behaviors, and a heightened priority given to gaming over daily responsibilities (Ankara & Baykal, 2022).

The World Health Organization identifies key criteria for diagnosing digital gaming addiction, including the increasing frequency and duration of digital gaming, the presence of impaired controls over gaming activities, and the elevated priority of gaming over daily life. This addiction can lead to various physical and psychological problems, particularly among children, such as obesity (Yalçin Irmak & Erdoğan, 2016), eye-related issues, transmission of inappropriate messages to the subconscious, aggressive behaviors, communication difficulties, and lower levels of self-esteem.

- **Psycho-educational effects**

The concept of psycho-educational effects is often used in the field of education to refer to the impact of various psychological and educational interactions and phenomena inside and outside the classroom on the learner (Wang et al., 2020). To be more precise, this concept can be encapsulated in the sum of affective, cognitive, psychological, and cognitive variables that have the potential to influence the learner, either negatively or positively, during the process of learning and acquisition.

Procedurally, this study, aims to examine the psychological, educational, and cognitive effects that impact the learner's learning process and acquisition. It focuses on two variables: the nature of engagement with digital games and the flow of attention.

- **Learning**

its common usage. It is not limited to formal or intentional learning that requires study, effort, and continuous training, nor is it solely about acquiring information without considering other forms of acquisition. Learning encompasses everything an individual acquires, including knowledge, meanings, thoughts, attitudes, emotions, inclinations, abilities, habits, and motor and non-motor skills. This acquisition can occur deliberately and intentionally or incidentally and unintentionally (Pedaste et al., 2015).

For example, the musical tune I hear several times without intending to memorize it, and later find myself singing, becomes a learned melody. Similarly, the fear of darkness or dogs resulting from an incidental incident is an acquired and learned fear. Therefore, learning, in this sense, becomes synonymous with acquisition and adaptation in a broader context for both intentional and unintentional processes.

On a procedural level, learning is understood to be any change in the learner's educational behavior that enables them to acquire knowledge and skills.

- **Attention**

William James presented the first psychological definition of attention in 1890 in his book titled "Principles of Psychology" He considered it a clear, active, and continuous mental mobilization of topics among other possible subjects or sequences. Its essence involves focalization and the concentration of consciousness, which entails diverting some topics to effectively and efficiently process others (James, 1842). Therefore, attention is the lively possession of the mind over one thing among several things or sequences of thoughts that could be available at the same time.

As a procedural definition of attention, it can be considered as an individual's concentration of awareness on a stimulus that holds significance compared to other competing variables present at the same time.

- **Learner**

This term is used by modern pedagogical trends in detail due to their recognition and belief in the individual's capabilities and their ability for self-learning. It emphasizes personal initiative in learning and highlights the learner's effectiveness in the learning process. This implies that learning is a self-directed activity based on the self-construction of knowledge. In the traditional relationship between the teacher and the student, the term "learner" replaces the term "student" within the framework of the "learning to learn" approach (V. Singh & Thurman, 2019). The

current descriptor "learner" is an attempt to elevate the value of the learner as an active participant in their learning, with a focus on both the cognitive and emotional aspects.

In the context of this research, the term "learner" in the plural form refers to those individual competencies that drive individuals towards active, effective, and participatory acquisition of knowledge.

Materials

The researcher utilized a well-known statistical software, namely the SPSS program, in the data transcription process. Additionally, the Minitab program was employed. Moreover, Excel played a significant role, especially in the first axis related to general information about the subject of the study. Specifically, it was used for transforming the data obtained from the Google Forms database into editable and convertible formats, such as charts and tables, within Excel.

Methods and sample

About the research topic, its questions, and hypotheses, we chose to adopt one of the most common and widely used approaches, namely the descriptive-analytical method. This method aims to collect the maximum amount of information about psychological and social facts and phenomena through our field orientation to study the psycho-educational effects of digital games on learners. To achieve this goal, we utilized an electronic questionnaire as a tool by Likert scale (Strongly Disagree, Disagree, Somewhat Disagree, Neutral, somewhat agree, agree, strongly agree), the questionnaire used in this study includes a set of questions specified by MICA-jv in the scale measuring the addiction rate to digital games. Additionally, it includes other questions related to attention, incorporating items from Mustafa Al-Ziyat's attention battery, regarding the study sample, the study sample, consisted of 100 participants, including 50 males and 50 females, all at the second-year level of the bachelor's degree.

It is worth noting that we transformed the questionnaire items from the second-person format to the first-person format to facilitate the learner's understanding and comprehension of its content. This transformation was carried out without neglecting questions related to general information about the subject of the study, such as gender, and other dimensions associated with the subject's overall condition. We aim to gather accurate information and draw conclusions directly related to the research questions and hypotheses.

Cronbach's alpha coefficient for assessing the reliability and stability of the split half of the questionnaire

Cronbach's alpha statistic is widely used in the social sciences, business, nursing, and other disciplines, Cronbach's alpha is a measure used to assess the reliability, or internal consistency, of a set of scale or test items. In other words, the reliability of any given questionnaire refers to the extent to which it is a consistent measure of a concept, and Cronbach's alpha is one way of measuring the strength of that consistency Cronbach's alpha is computed by correlating the score for each scale item with the total score for each observation (A. S. Singh, 2017), and then

comparing that to the variance for all individual item scores, the mathematical formula for the test can be expressed as follows:

after we applied the questionnaire, we obtained the following results:

Table 1. Cronbach's alpha coefficient for assessing the reliability

and stability of the split half of the questionnaire

		Cronbach's alpha	n
Questionnaire		0.895	100

Through this table, it becomes clear that Cronbach's Alpha reliability coefficient (0.895) has met the required threshold for the survey's reliability. This indicates that the survey exhibits a high level of stability, providing the researcher with confidence before its distribution to the sample individuals.

Results and discussion

- **Distribution of Sample Individuals According to Gender**

Table 2. Sample Individuals According to Gender

Gender	Number	%	n
Males	50	50	100
Females	50	50	

About the previous table, it is evident that the distribution of males equals the distribution ratio of females. This indicates the equality of sample individuals concerning the gender variable.

- **H1.** We assume that the engagement with digital games by learners negatively affects the attention process.

To examine the above hypothesis, we present the respondents' answers to the item included in the questionnaire, which is: "**I feel distractibility and attentional dispersion**" In the following:

Fig 1. The percentage of learners' feelings of distraction and attentional dispersion
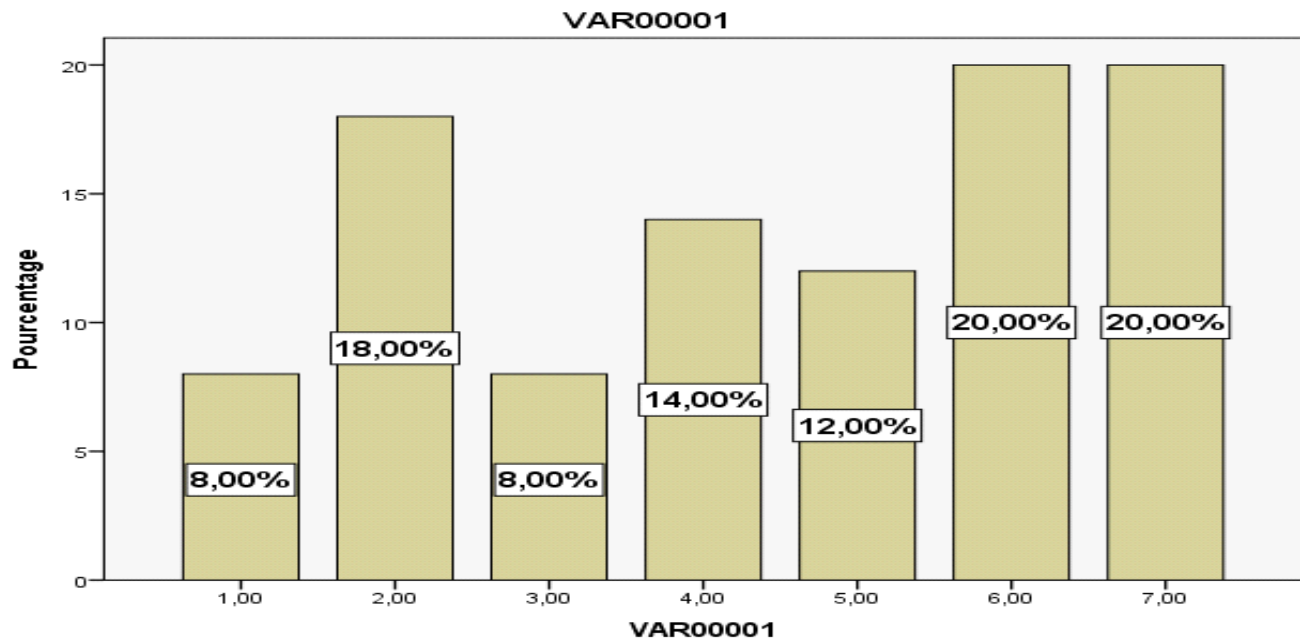
As a preliminary analysis of the available data, it can be stated that 20% is the share of learners who responded with "strongly agree" and "agree" to the question content. Learners who responded "agree to some extent" constituted 12%, while 14% represented those who provided a neutral response, neither agreeing nor disagreeing. Additionally, 8% is shared by learners who answered with "disagree to some extent" and "strongly disagree." Meanwhile, 18% represent learners who expressed their disagreement with the content of the question.

To discuss this data, and contrary to the previous findings we refer to a study conducted by Daniela Karine Ramos and Hiago Murilo Melo in 2018 titled "Can digital games in school improve attention? A study of Brazilian elementary school students", the researchers employed an experimental approach, dividing the research sample of 100 learners, aged between seven and nine years, into two groups: a control group and a homogeneous group. Before testing the effectiveness of digital games in improving attention flow, the researchers conducted a pre-test measurement of attention using the D2 attention scale.

Following the pre-test, the control group was taught using conventional pedagogy, involving methods commonly used in regular education such as learning through film presentations and lectures. In contrast, the homogeneous group had digital games integrated into their instruction, adopting a program called "Brain School," which incorporates digital games into the educational process. The scoring in these games was based on scientific and precise criteria such as stability, accuracy, time, speed, and other indicators, enabling the researchers to measure three cognitive skills: problem-solving, working memory, and attention (Ramos & Melo, 2019).

The researchers ultimately concluded, after a two-dimensional measurement of attention flow, that relying on digital games significantly improves cognitive competencies in general, particularly in attention flow with precision and specificity.

- **H2.** We assume that the engagement with digital games by learners reaches the level of addiction.

To examine the above hypothesis, we present the respondents' answers to the item included in the questionnaire, which is: "**How much time is spent playing digital games?**" In the following:

Table 3. The number of hours learners engage in digital gaming

Number of hours	%	n
1 to 2	20	
2 to 4	14	
4 to 6	62	100
6 or more	4	

A reading of the above data makes it clear to us that the students or respondents indicated that they spend between two to four hours playing digital and electronic games, constituting approximately 14% of them. Meanwhile, the students who spend one to two hours playing these games do not exceed a percentage of about 20%. As for the majority, a whopping 62% of the respondents stated that they spend between four to six hours playing digital and electronic games. The remaining 4% represents students who immerse themselves in periods exceeding six hours, deeply engaged in living between the screens of phones and computers.

To discuss this matter, we refer to a study by Eui Jun Jeong and others in 2017 titled "Why do some people become addicted to digital games more Easily? A study of digital game addiction from a psychosocial health perspective". The study concluded that addiction to digital games is influenced by a combination of psychological and social factors. One prominent factor is the learners' sense of loneliness, which drives them to become addicted to digital games as a means to escape feelings of solitude and isolation. Additionally, the prevalence of virtual social relationships takes precedence over the absence of real-world social connections. This is compounded by the element of enjoyment provided by digital games, which serve as a refuge for learners seeking to escape from social problems (Jeong et al., 2017).

In the same context, the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) acknowledges that when a learner spends more than five hours playing digital games, it goes beyond the specified limit. This prompts a discussion in this case about digital gaming addiction (IGD) (Chew & Wong, 2022).

- **H3.** We hypothesize that combat-oriented games like FREE FIRE and PUBG are the most widespread among learners.

Games	%	n
FREE FIRE	28	
FIFA	12	
PUBG	16	
Parchisi	2	100
GTA	4	
8 pool ball	2	
Others games	30	

Table 4. The most played digital games among learners

To verify the hypothesis, we invoke the learners' responses to the question posed "**Among the following games, which one do you prefer to play?**"

The table above indicates that a 2% share is allocated to two games, 8Pool Ball and Parchisi. The three highest shares are distributed among three games, two of which fall under the category of war games. Specifically, we are referring to the games PUBG and FREE FIRE, with the former accounting for approximately 16%, while the latter, being the most popular among learners, reached around 28%, meanwhile, the percentage of learners who prefer playing FIFA is approximately 12%, whereas those who favor playing GTA do not exceed approximately 4%, the remaining games collectively share a percentage of 30%.

Based on the aforementioned, it becomes evident that Free Fire and PUBG are the most widely consumed games among learners, both being war-themed games. These numbers may explain the observed excessive engagement of learners with these particular games. It is rare to find a household without the sound of weapons being used by learners as they play these games, striving to surpass levels and reach advanced warriors within the game.

To delve deeper, the primary reason behind this is attributed to learners feeling like they are escaping from their reality and becoming accustomed to a world dominated by combat and conflict for survival. Additionally, the excitement provided by these games contributes to learners eagerly anticipating surpassing their current levels, hoping to reach advanced stages where they can acquire formidable weapons. All of this provides a form of pleasure, fun, and an escape from reality, leading learners to immerse themselves and become addicted to games, especially those related to combat and martial arts (Limone et al., 2023).

Moreover, most studies have highlighted the negative psychological and social effects of digital games, which can lead learners to experience feelings of loneliness, isolation, psychological stress, a decline in academic achievement, as well as feelings of anxiety and depression (Sakinah et al., 2022).

Conclusion

In conclusion, it can be said that this research yielded numerous and diverse results, among which is the finding that digital games negatively impact the attention process. Therefore, the first hypothesis, represented by the idea that "We assume that the engagement with digital games by learners negatively affects the attention process". was confirmed. On the other hand, field study results revealed that learners experience a state of addiction to digital games, primarily due to the number of hours spent playing them, which may exceed four hours daily. This observation leads us to affirm the second hypothesis, which states that "We assume that the engagement with digital games by learners reaches the level of addiction", considering the most consumed games among learners, Free Fire takes the lead, followed by PUBG, and then FIFA. Based on this information, we can confirm the achievement of the third hypothesis, which asserts that "We hypothesize that combat-oriented games like FREE FIRE and PUBG are the most widespread among learners".

The obtained results, which indicate that digital games do negatively impact the attention process of learners, seriously prompt us to contemplate the following question: What makes digital games so appealing to learners to such an extent? And how can this factor be utilized to enhance learners' motivation for learning and improve academic performance and cognitive processes?

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