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Research Paper

Association Between Playing Video Games, General Health and Academic Performance of Fasa Mid-schools Boy Students

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ABSTRACT

Background: Nowadays, children and teenagers are heavily influenced by video games. Excessive video games may affect children's physical and mental health as well as academic performance.

Objectives: The present study aimed at determining the correlation between playing video games and general health as well as academic performance of Fasa mid-schools boy students at Iranian secondary school level.

Materials & Methods: This cross-sectional study was carried out on 150 boy students at secondary school level in Fasa, Fars Province, Iran. The subjects were selected through multistage cluster random sampling method. The data were collected using a three-part questionnaire including demographic information, information about how to use video games and General Health Questionnaire (GHQ). The collected data were analyzed by using SPSS v. 22, descriptive statistics, correlation coefficient, t-test, and Chi-square test. $P<0.05$ was considered as statistically significant.

Results: Findings revealed that there was a significant direct correlation between the amount of video game use and overall general health ($r=0.25$, $P=0.03$); a significant inverse relationship was also found between the amount of video game use and academic performance of the students in first ($r=-0.41$, $P=0.002$), second ($r=-0.30$, $P=0.02$) and third grade ($r=-0.42$, $P=0.02$) of mid school students. There was no significant difference in the general health between the two types of game played. There was also a significant relationship between students' academic performance categories and the type of video game ($P<0.001$).

Conclusion: Based on the findings, it can be concluded that video games can play a crucial role in the general health and academic performance of students. Thus, it is vital that parents pay more attention to the duration of playing and type of games their children play.

Keywords: Video games, General health, Academic performance, Students, boys

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1. Introduction

Video games, as a social phenomenon along with other audio and visual media of today's world, have selected its most important audience as children and adolescents [1]. Nowadays, children and teenagers are heavily influenced by computer games. Given the significance of playing games in social life of this age group, video games have inevitably claimed a major part of the children and adolescents' time playing rather than dealing with social interactions [1]. The ease of access to a variety of video games along with the audiovisual effects, high level of fantasy, the variety of genres, and the capacity to create excitement have made these games gain popularity among children and adolescents. According to research, 97% of Americans between the ages of 12 and 17 have played one type of video game, and 31% to 21% of the teens are immersed in gaming every day or 3 to 5 days a week, respectively [2]. As the statistics show, the largest number of people playing video games in the United States ranged from 7-17 years old [3]. The latest research has shown that on average the kids between 8-11 years of age played video games for 12 hours a week and children of 13-14 played 15 hours. The older they get, the more hours they spend playing video games [4]. Although there are no definite statistics on the amount of time Iranian spend on gaming, according to some studies with a limited sample size, Iranians play games between 1 to 5 hours and even slightly more than 6 hours in a week [5, 6].

Accordingly, increased rapid access to and use of computers plus video games among children and adolescents have caused some concerns [3]. In this regard, the surveys carried out on the video game clubs and net games in Iran indicate that a significant number of Iranian children and adolescents can mention the name of the games. In other words, dealing with video games has been practically associated with social credit of children and adolescents in Iran [7] in a way that children's social activities have been replaced by video games and other forms of electronic entertaining devices [8]. This is because the industries as well as computer and accessories manufacturing companies have expanded their penetration and usage rates among families annually and in particular among school students. The easy access to as well as an increase in the use of video games can create problems for their users leading to dependency pathological conditions. Sedentary behaviors that lead to prolonged physical inactivity is related to poor fitness outcomes including a higher risk of cardiovascular disease, obesity, and diabetes [9]. Studies carried out on 6-18 year-old students in India showed that students addicted to video games and the Internet had problems such as procrastination for assignments, losing sleep hours, and feeling tired [10]., since playing video games is a leisure time or hobby, second to watching television, too much of it can cause complications such as obesity and overweight, computer dependency, aggression, anxiety, poor academic performance, and depression in children as well as adolescents in settings such as schools, homes, and communities [11]. Other studies have also shown that there is a significant correlation between spending too much time watching TV as well as playing long hours of video games and a downfall in children's and adolescents' grades in schools, along with an increase in the risk of obesity and other health-threatening hazards [4, 12-14]. Along this line of argument, as physical activity has been replaced by playing video games, it is necessary to heed that such an entertaining pattern is a warning sign for children and adolescents' health in both short and long terms [11, 15] because the identity of children is molded during adolescence. For this reason, mass media and video games play an important role in adolescents following models in a way that the characters of games with violent contents would become their role models [4]. Studies have shown that men play significantly more video games than women, which interferes with classroom preparation and sleep [16]. Another study reported that about 72% of the most frequent players are boys/men [17].

Computer games, if use improperly, can cause destructive effects on children and adolescents' health [15]. Based on recent studies, an association has been found between increased duration of video games and a decline in some physical health indicators, but there is scarce evidence to draw conclusions from existing studies [18]. A review study conducted in 2020 to examine the possible association between video games and general health showed that there are conflicting results regarding the relationship between the two variables; studies have shown that video games have many negative consequences for public health, while other studies have reported a lower risk. The researchers stated more studies were required to draw stronger conclusions [18]. Thus, given the controversial results about the outcomes of video games on youngsters' and adolescents' health, the researchers intended to conduct an unprecedented study to explore the association between playing video games and general health as well as academic performance of Fasa mid schools boy students.

2. Materials and Methods

This cross-sectional was carried out on 150 boy students at secondary school level in Fasa, Fars Province, Ian in 2017. A sample size of 150 was calculated based on standard deviation=3.5 [19], precision=0.6, 5% type 1 error, and design effect=1.2. The participants were selected through multistage cluster sampling. In the first stage, among all areas in Fasa, 3 areas (clusters) were randomly selected. Then, 1 mid school was randomly selected from each area (3 mid school). The researchers randomly selected 50 students from each mid school via simple random sampling using random number table.

The inclusion criteria were as follows: 1) not having a history of mental disorders; 2) being a student (aged between 15 and 17) of a mid-school; 3) not having been suffering from a serious psychological or physical disorder in recent years; 4) willing to participate in the study. All participants agreed to participate in the study and signed an informed consent. The participants were assured that their information would remain confidential.

The data collection tool was a three-part questionnaire in which the first part was devoted to the demographic variables including age, occupation, and education level of parents of the students. The second part of the questionnaire dealt with the types of use of video games which included questions about the genres of video games (intellectual, educational, action, shooters, police) and the amount of time spent on playing video games. The genres of the games were divided into rough and simple. In this research, computer games such as intellectual and educational games were considered as simple, but computer games such as action and police games were regarded as rough ones. The reliability of this part of the questionnaire in Farmanbar et al. study [19] was measured through test-retest method with r=0.87, Cronbach alpha=0.83, and P-value < 0.05. The third part included question items on general health condition which were taken from Goldberg General Health Questionnaire (GHQ). This questionnaire, developed by Goldberg and Hillier (20), included 28 items with a four-point scale from "not at all" (zero score) to "more than average" (3 scores) in 4 areas: Somatic symptoms, tension / sleeping disorder, social dysfunction and sadness side effects.

This questionnaire has been translated into 38 languages and widely used in different cultures. Accordingly, it has been used in psychometric studies in 70 countries [20]. Reliability, validity, and element structure of the Persian translation of general health questionnaire (GHQ-28) have already been confirmed by Valizadeh et al. [21]. In addition, the reliability of this questionnaire was confirmed by Cronbach's alpha coefficient as 0.88 for the present study.

Academic performance of the participants was measured according to their GPA out of 20. If their GPA ranged between 10 and 11.9, it was taken as "very weak", 12-13.99 as "weak", 14-15.99 as "average", 16-17.99 as "good", and 18-20 as "excellent".

The questionnaires were collected through self-report approach in one step. The selected participants were assured that all collected data would be kept confidential. The participants could have access to the data on their wills. The data were introduced into the statistical package for social sciences (SPSS) version 22. Data described using frequency and percent or mean and standard deviation (SD) according to the type of variables. Pearson correlation coefficient, t-test, and Chi-square test were used for data analysis.

3. Results

In the present study, the mean age of the participants, their fathers and mothers were 14.12 (SD=1.63), 39.66 (SD = 5.29), and 36.66 (SD=5.40), respectively. The subjects' fathers were mostly freelance (60%) while their mothers were housewives (74%). In terms of education level, 50% of the subjects' fathers and 48% of their mothers had a diploma (Table 1). Fifty-eight students (38.67%) participating in this study were in the third grade of the mid schools. Out of 150 students, 46 66(44%) played simple games (21% intellectual games and 23% educational ones) and 84 (56%) were gamers of rough games (18.6% police games and 37.4% action games). Regarding the time spent on gaming, 23 people spent 1 hour, 27 people 2-3 hours, 69 subjects 4-5 hours, and 31 participants used video games more than 5 hours a day (Table 1).

Table 2 shows correlation coefficient of the amount of video game use with subscales of general health and academic performance. There was statistically significant direct correlation between the amount of time spent on playing video game and general health. There was also a significant relationship between the amount of time spent on playing computer games and general health scales including somatic symptoms, anxiety/insomnia, and depression symptoms. However, there was no significant relationship between the amount of video game use and social dysfunction (P=0.86). There was also a significant inverse correlation between the amount of time spent on playing video games and students' aca-

Table 1. Frequency distribution of demographic characteristics of participants

Demographic	Classification	No. (%)
Students age (Y/O)	13	45(30)
	14	47(31.33)
	15	58(38.67)
School grade	First mid school	44(29.33)
	Second mid school	48(32)
	Third mid school	58(38.67)
Fathers age (Y/O)	20-29	0(0)
	30-39	66(44)
	40-49	78(52)
	50-60	6(4)
Mothers age (Y/O)	20-29	20(13.33)
	30-39	88(58.66)
	40-49	42(28)
	50-60	0(0)
Fathers education	Non education	1(0.7)
	Primary	34(22.7)
	Diploma	68(45.3)
	Sub diploma	20(13.3)
	Bachelor	27(18)
Mothers education	Non education	1(0.7)
	Primary	37(24.7)
	Diploma	72(48)
	Sub diploma	21(14)
	BA	19(12.7)
Fathers job	Worker	14(9.3)
	Employment	59(39.3)
	Free	74(49.3)
	Unemployment	3(2)
Mothers job	Employment	33(22)
	Free	6(4)
	Household	111(74)

Table 2. Correlation between students' general health, academic performance and the amount of use of video games

Variable	Classification	Amount of Video Game Usage		P
		Frequency (n)	R*	
General Health Scales	Physical symptoms	150	0.18	0.02
	Anxiety symptoms and sleep disorders	150	0.45	0.01
	Social function	150	0.01	0.86
	Symptoms of depression	150	0.19	0.04
	General health (total)	150	0.25	0.03
Academic performance	First mid school	44	-0.41	0.002
	Second mid school	48	-0.30	0.02
	Third mid school	58	-0.42	0.02

*Pearson correlation coefficient

Table 3. The relationship between students' general health and the type of game

General Health Scales	Game Type	Mean	Standard Deviation	P
Physical symptoms	Simple	11.71	1.89	0.90
	Rough	11.84	1.84	
Anxiety symptoms and sleep disorders	Simple	10.47	1.20	0.12
	Rough	10.39	1.54	
Social function	Simple	10	1.47	0.69
	Rough	10.24	1.36	
Symptoms of depression	Simple	10.43	1.73	0.07
	Rough	10.52	2.01	
General health (total)	Simple	42.63	3.57	0.37
	Rough	43.01	3.83	

Table 4. The relationship between students' academic performance and the type of video games

Game Type	Academic Performance					Total	P
	Very Weak	Weak	Intermediate	Good	Very Good		
Simple	10(15.1)	19(12.70)	7(10.6)	12(18.2)	18(18.2)	66	0.001
Rough	26(30.9)	28(33.3)	20(23.8)	5(5.9)	5(5.9)	84	

Values are frequency (%)

demic performance in first (P=0.002), second (P=0.02) and third grade (P=0.02) of mid school students.

Table 3 shows the mean score of general health subscales and according to the type of game use, respectively. There was no significant difference in the general health between simple and rough game users. Table 4 illustrate the frequency of academic performance categories according to the type of game use. The chi-square test of independence shows that the relation between academic performance and type of game use was significant (X2 (4, N=150)=23.5, P<0.001). simple game users were more likely than men to have very good or good scores (18.2% vs 5.2%, respectively).

4. Discussion

The results of the study indicated a correlation between playing video games and general health as well as academic performance of Fasa mid schools boy students. The results showed that all students participating in the study would play video games, 69.4% of whom playing rough games; 47.7% were action gamers. Meanwhile, 46% of the subjects stated that they would spend 4-5 hours playing video games during the day. In research by Enayatie et al., the results showed that 46.2% of teens spent one hour playing video games per day and 53.8% more than an hour. In Jafarzadeh et al. study (2015), it was stated that 68.7% of students spent more than two hours a day playing video games [22]. Alikhani et al. also reported that children and teens would spend 4 hours on gaming on the days they are off and three hours the rest of the days [23]. These findings contrast with the recommendation of American Academy of Children, where the time of playing video games should be limited to one hour per day for children and adolescents [24].

The results also showed that there is a significant statistical correlation between the amount of the time spent on playing video games and the quality of students' general health status; a significant statistical correlation was found between the amount of time playing video games and the appearance of somatic symptoms, anxiety/insomnia, and depression symptoms. Sun et al. (2008) with the aim of examining the relationship between the rate of computer use and the amount of weight as well as exercise activity in children and adolescents, concluded that there was a significant statistical relationship between the duration of computer games played and sleep deprivation, depression, low self-esteem, and physical disorders [25]. In a study by Jafarzadeh (2015), 76.7% of children were reported to have vision problems, 36.7% skeletal disorders, and 62% aggressive behaviors [22]. This lends support to previous findings in Starker et al. study (2009) where there was a significant relationship between playing video games and visual plus skeletal disorders [26]. Robbins et al. study (2009) further reported that the prevalence of skeletal disorders was 32% [27]. Thus, there is a direct relationship between the amount of time spent on playing video games and the occurrence of violent as well as anxiety behaviors along with physical problems in children and adolescents which can endanger their health and life [23]. Thus, parents and the authorities of the schools need to be advised in order to help their children and teens with the selection of video games as well as budgeting their time.

In the present study, a significant correlation was found between the amount of time spent on playing video games and the students' academic performance revealing that students who spent more time playing video games had lower academic performance. The findings of the study by Saffaryan Hamedani [28], Ventura [29], and Sinder [30] also showed that there was a statistically significant correlation between the quantity of time spent on playing video games and the academic performance of students, concurring with those of the present study. Thus, taking into consideration that students who play long hours of video games had lower academic performance and that the main reasons that children and adolescents are inclined to play these games are easy access to video games, lack of parents' appropriate programs to fill their children's leisure time as well as unavailability of suitable sports and recreational facilities; so, parents should be advised to both supervise the amount of time that children spend on playing video games and have some suitable programs for filling their children's leisure as well as study time [28].

The results of the study revealed no significant relationship between students' general health and the type of games played. In other words, students' general health condition was not affected by playing rough or simple games. In addition, there was a significant relationship between students' scholarly performance and the type of video games played by the participants. Those students who played simple games (intellectual, educational games) had a higher academic performance than those playing rough games with violent contents (action, action games). Thus, it is vital that the contents of video games be transformed from violence to scientific and educational ones. According to the results of the present study, the researchers stated that the type of video games can affect different aspects of users' lives. Violent video games are more harmful than useful, and one of their negative effects is the academic decline among students [31].

We are aware that our research may have two limitations. The first is the accuracy of the answers given to

questionnaire items by the subjects. The second was not conducting a study on the students in all schools including state and non-profit schools, as well as girls' schools in Fasa.

5. Conclusion

The present study found a significant correlation between playing video games and general health as well as academic performance of boy students. Longer use of video games increased physical symptoms, anxiety, sleep disorders, and depression of participants. Thus, it is necessary for parents to pay more attention to the duration and type of games of their children play and should have some suitable programs for filling their children's leisure as well as study time. By taking such measures, it is hoped that the detrimental effects of playing video games on common wellbeing and academic performance of students can be minimized. Researchers suggest that future studies consider the relationship between video games and other child-related variables.

Ethical Considerations

Compliance with ethical guidelines

This study has been approved by the Ethics Committee of Fasa University of Medical sciences (Ethical Code: IR.FUMS.REC.1396.157). All information All facts become stored personal and the contributors' names have been changed via way of means of codes. The contributors have been loose to withdraw from the look at any degree of the research.

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

[1] Al-Hileh MM, Ibrahim NS. The advantages and disadvantages of electronic games played by children aged (3–6) years, from mothers and kindergarten teachers' point of view. Inter J Appl Eng Res. 2018; 13(4):1805-12. https://www.ripublication.com/ijaer18/ijaerv13n4_01.pdf

[2] Dishon G, Kafai YB. Connected civic gaming: Rethinking the role of video games in civic education. Interact Learn Environ. 2022; 30(6):999-1010. [DOI:10.1080/10494820.2019.1704791]

[3] Agarwal N, Sangerand S, Luqman N. Relationship of computer game addiction with loneliness and aggression level in adolescents. Int J Multidiscip Curr Res. 2017; 5:1379-82. http://ijmcr.com/relationship-of-computer-game-addiction-with-loneliness-and-aggression-level-in-adolescents/

[4] McLean L, Griffiths MD. The psychological effects of video games on young people: A review. Aloma. 2013; 31(1):119-33. https://www.raco.cat/index.php/Aloma/article/viewFile/266790/354412

[5] Durugu P. A study on evolution of violence in video games, individual perceptions and its impact on society. Mass Commun. 2018; 12(4):33-9. [DOI:10.5958/0973-967X.2018.00025.X]

[6] Valadez JJ, Ferguson CJ. Just a game after all: Violent video game exposure and time spent playing effects on hostile feelings, depression, and visuospatial cognition. Comput Human Behav. 2012; 28(2):608-16. [DOI:10.1016/j.chb.2011.11.006]

[7] Tamouk F, Ebrahimi M. [Surveying the amount of dependence on short messages (SMS) and alienation with academic burnout among female high school students in Ardebil (Persian)]. J Sch Psychol. 2016; 5(2):39-54. http://jsp.uma.ac.ir/m/article_439_9e678cce943a446d4c78635a72c3e0e5.pdf?lang=en

[8] Engelhardt CR, Bartholow BD, Kerr GT, Bushman BJ. This is your brain on violent video games: Neural desensitization to violence predicts increased aggression following violent video game exposure. J Exp Soc Psychol. 2011; 47(5):1033-6. [DOI:10.1016/j.jesp.2011.03.027]

[9] Panahi S, Tremblay A. Sedentariness and health: Is sedentary behavior more than just physical inactivity? Front Public Health. 2018; 6:258. [DOI:10.3389/fpubh.2018.00258] [PMID] [PMCID]

[10] Neverkovich SD, Bubnova IS, Kosarenko NN, Sakhieva RG, Sizova ZM, Zakharova VL, et al. Students' internet addiction: study and prevention. Eurasia J Math Sci. Technol Educ. 2018; 14(4):1483-95. [DOI:10.29333/ejmste/83723]

[11] Shokouhi-Moqhaddam S, Khezri-Moghadam N, Javanmard Z, Sarmadi-Ansar H, Aminaee M, Shokouhi-Moqhaddam M, et al. [A study of the correlation between computer games and adolescent behavioral problems. Addict Health. 2013; 5(1-2):43-50. [PMCID]

[12] Gentile DA. The multiple dimensions of video game effects. Child Dev Perspect. 2011; 5(2):75-81.[DOI:10.1111/j.1750-8606.2011.00159.x]

[13] Anderson CA, Gentile DA, Dill KE. Prosocial, antisocial, and other effects of recreational video games. In: Singer DG, Singer JL, editors. Handbook of children and the media. United States: Sage Publications; 2012. https://books.google.com/books/about/Handbook_of_Children_and_the_Media.html?id=n8E5DQAAQBAJ

[14] Stockdale L, Coyne SM. Video game addiction in emerging adulthood: Cross-sectional evidence of pathology in video game addicts as compared to matched healthy controls. J Affect Disord. 2018; 225:265-72.[DOI:10.1016/j.jad.2017.08.045] [PMID]

[15] Kelishadi R, Hovsepian S, Djalalinia S, Jamshidi F, Qorbani M. A systematic review on the prevalence of metabolic syndrome in Iranian children and adolescents. J Res Med Sci. 2016; 21:90. [DOI:10.4103/1735-1995.192506] [PMID] [PMCID]

[16] Ogletree SM, Drake R. College students' video game participation and perceptions: Gender differences and implications. Sex Roles. 2007; 56(7-8):537-42. [DOI:10.1007/s11199-007-9193-5]

[17] Jurica B, Alanis K, Ogletree S. Sex differences related to video arcade game behavior. Psi Chi J Psychol Res. 2002; 7(3):145-8. [DOI:10.24839/1089-4136.JN7.3.145]

[18] Pelletier VH, Lessard A, Piché F, Tétreau C, Descarreaux M. Video games and their associations with physical health: A scoping review. BMJ Open Sport Exerc Med. 2020; 6(1):e000832. [DOI:10.1136/bmjsem-2020-000832] [PMID] [PMCID]

[19] Farmanbar R, Tavana Z, Estebsari F, Roushan Z. [The relationship between playing computer games with aggression among middle school students in the city of Rasht in 2013 (Persian)]. Iran J Health Educ Health Promot. 2013; 1(3):57-66. http://journal.ihepsa.ir/article-1-74-en.html

[20] Werneke U, Goldberg DP, Yalcin I, Üstün BT. The stability of the factor structure of the General Health Questionnaire. Psychol Med. 2000; 30(4):823-9. [DOI:10.1017/S0033291799002287] [PMID]

[21] Valizadeh R, Kavari zadeh F, Yasemi M, Yasemi MR, Rashidbeigi M, Tavan H. [Psychometric properties of the General Health Questionnaire (GHQ -28) (Persian)]. J Ilam Univ Med Sci. 2015; 22(6):44-50. https://sjimu.medilam.ac.ir/article-1-2449-en.html

[22] Jafarzadeh S, Mohammad khan Kermanshahi S. [Parental views about complications of computer game in school age girls (Persian)]. Iran J Nurs. 2015; 28(93):163-72. [DOI:10.29252/ijn.28.93.94.163]

[23] Alikhani S, Zare M, Bahonar A, RAmezankhani A, Delavari A, Rahbani S, et al. [A study on association between watching television and videos with violent behaviors in male secondary and high school students of Pakdasht district (Persian)]. Med Sci. 2007; 17(1):45-9. http://tmuj.iautmu.ac.ir/browse.php?a_code=A-10-1-95&slc_lang=en&sid=1

[24] American Academy of Pediatrics. From the American Academy of Pediatrics: Policy statement--Media violence. Pediatrics. 2009; 124(5):1495-503. [DOI:10.1542/peds.2009-2146] [PMID]

[25] Sun P, Unger JB, Palmer PH, Gallaher P, Chou CP, Baezconde-Garbanati L, et al. Internet accessibility and usage among urban adolescents in Southern California: Implications for web-based health research. Cyberpsychol Behav. 2005; 8(5):441-53. [DOI:10.1089/cpb.2005.8.441] [PMID]

[26] Straker L, Pollock C, Maslen B. Principles for the wise use of computers by children. Ergonomics. 2009; 52(11):1386-401. [DOI:10.1080/00140130903067789] [PMID]

[27] Robbins M, Johnson IP, Cunliffe C. Encouraging good posture in school children using computers. Clin Chiropr. 2009; 12(1):35-44. [DOI:10.1016/j.clch.2009.03.003]

[28] Saffarian Hamadani S, Abdullahi M, Daei Zadeh H, Bayat Y. [The relationship between the use of computer games and mental health and academic performance (Persian)]. J Inf Technol Commun Educ. 2013; 3(11):5-20. https://ictedu.sari.iau.ir/article_633420_01fa0c178c51d7f772ac25a897e1375b.pdf?lang=en

[29] Ventura M, Shute V, Kim YJ. Video gameplay, personality and academic performance. Comput Educ. 2012; 58(4):1260-6. [DOI:10.1016/j.compedu.2011.11.022]

[30] Andersen E, O'rourke E, Liu YE, Snider R, Lowdermilk J, Truong D, et al. The impact of tutorials on games of varying complexity. Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 2012 May 5. Montréal Québec, Canada. [DOI:10.1145/2207676.2207687]

[31] Vojdani F, Heydari S. A Study of the potential impacts of violent videogames on moral behavior of users based on Rest-Narvaez'model. 2019; 12(46):133-64. [DOI:10.22034/JSFC.2019.100940]