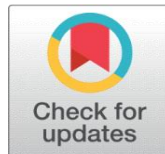
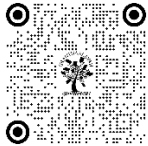


INVESTIGATING ONLINE GAME ADDICTION: AN IN-DEPTH ANALYSIS OF DESIGN ELEMENTS THROUGH THE PLAYER ENGAGEMENT MODEL

Berlin Sachu ¹, Kadeswaran S ², Jayseelan R ³

¹ Research Scholar, Department of Journalism and Mass Communication, PSG College of Arts & Science, India

^{2,3} Assistant professor, Department of Visual Communication & Electronic Media, PSG College of Arts & Science, India



Corresponding Author

Berlin Sachu,
berlinsachu555@gmail.com

DOI
[10.29121/shodhkosh.v5.i3.2024.1222](https://doi.org/10.29121/shodhkosh.v5.i3.2024.1222)

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Copyright: © 2024 The Author(s). This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

With the license CC-BY, authors retain the copyright, allowing anyone to download, reuse, re-print, modify, distribute, and/or copy their contribution. The work must be properly attributed to its author.



ABSTRACT

The study investigates game addiction by using the design elements of Online video games through the player engagement model. The study explores the motive of the addicted behaviour of gamers and finding the association between game addiction and game design elements standardised by game creators. The study utilizes a quantitative methodology and gathered data from 309 samples through questionnaires focusing on their engagement with game design elements and Game addiction was assessed using the Video Game Addiction Test. Statistical analyses reveal associations among variables, indicating that the design elements of online video games do not directly contribute to the development of video game addiction. Instead, it is evident that individuals with lower levels of addiction place a significant emphasis on video game design aspects such as immersion, game mechanics, motivation, and social interaction. The research suggests that understanding the impact of design elements on addiction in gaming contexts can inform gamers about how to mitigate game addiction.

Keywords: Online Video Games, Video Game Addiction, Game Design Elements, Player Engagement Model

1. INTRODUCTION

In the world of modern digital entertainment, where changes are frequent, video gaming has become one of the most popular activities, engaged in by billions all over the globe (Daley, 2022) but with rising numbers of video game users come concerns about whether such use may lead to addiction; as this phenomenon becomes more common and better understood, public conversations on issues related to game addiction and anywhere from community to country grow larger. The surge in popularity of online video games is swiftly noticeable. Given the growing recognition of online game addiction as a valid concern, it becomes imperative to grasp the reasons and mechanisms behind individuals becoming addicted to these Online video games (Chuang-Chun Liu, 2016). Consequently,

gaming addiction has garnered heightened attention in research circles. Over the past decade, there has been a notable surge in empirical studies delving into diverse facets of video game addiction, surpassing the levels seen in the preceding decade. The potential impact of technological advancements, and the evolving nature of problematic video game use and addiction (Mark D. Griffiths, 2012). This research starts by trying to acknowledge that there is a crucial interrelationship between how players become engaged with Online video games and some of these design elements are quite problematic for addiction subsequently. And get into the specifics of game addiction problem as well, where ordinary people can understand it as talked in detail about below. With this study, the researchers hope to explore the subtler nuances of game design elements that fuel its charismatic appeal and might be the causing addiction through careful examination using the player engagement model. Scholars, decision-makers and the gaming industry have a deeper understanding of the problem by virtue of growing especially frequency game addiction. Grounded in psychology and designed for gamers, China telecom's mobile application has features such as "player friendliness" refused to divulge any of the platform's other analytics or statistics percentage of Chinese non-student internet use in 2013. The researchers are using the player engagement model, a conceptual framework that links game design elements and player engagement. By the aid of this model, we hope to gain understanding on ways in which particular design features lead to increased player engagement, and research the fine line between immersive gameplay and development of addictive behaviours. Our study has the potential to make a significant impact on the field by delving deeply into the intricate relationship between addiction and game design. Drawing on the diverse expertise of game design, research aims find whether the design elements of the game are the root causes of excessive gaming behaviour. Through this understanding, we aim to drive change in both industry practices and scholarly discussions, advocating for the prioritization of user well-being in game design. Our primary aim in launching this inquiry is to identify potential risk factors. Through a combination of theoretical frameworks and empirical evidence, this research endeavour hopes to contribute to the ongoing discourse on gaming addiction and offer a more holistic understanding of the intricate dynamics between gamers and the Online video games they engage with.

2. OBJECTIVE

This research explores game addiction through the player engagement model, analysing design elements that contribute to player engagement. It aims to understand their role in addictive behaviours and provide alertness into the relationship between game design elements and addiction. The findings can help develop strategies to mitigate and prevent excessive gaming habits.

3. WORLD TRENDS ON GAMING

The online gaming industry has become a powerhouse, surpassing the international film industry in revenue, with over \$142 billion generated in 2022. This staggering figure is nearly double the earnings of the film sector in 2023, highlighting the immense popularity and financial success of video Online video games (Crucial data on the global movie production and distribution industry in 2022., 2022) (Top Countries/Markets by Game Revenues, 2023). In 2016, the largest contributors to this expanding industry were the United States with \$46.4 billion, China with \$44 billion, and Japan with \$19.1 billion in estimated video game revenues. Remarkably, the gaming sector witnessed substantial growth during the

initial year of the pandemic in 2020, and this upward trajectory persisted throughout 2021 (A survey of the video game market in 2021, 2023). Positioned as a significant segment within the tech industry, gaming is integral to culture, entertainment, and technological advancement. Gaming companies, leveraging the latest technology, have successfully reached an audience of more than three billion people, solidifying their impact on a global scale (Daley, 2022). As the online gaming landscape continues to evolve, its influence on various aspects of society remains undeniable.

4. VIDEO GAME ADDICTION

Video game addiction, alternatively termed “gaming disorder” or “internet game addiction”, refers to a psychological state characterized by sustained and obsessive involvement with Online video games. This prolonged engagement results in notable impairments across various domains of an individual's life over an extended period of time. When gamers find themselves alone and unoccupied, they often turn to Online video games, using them as a coping mechanism for emotional relief and as a source of dopamine-driven rewards (Chuang-Chun Liu, 2016). Studies have revealed that prolonged gaming can negatively impact one's life, affecting self-control and academic performance (MARYAM HAGHBIN, 2013). Notably, video game addiction is not a binary distinction, as individuals at both high and intermediate risk levels can be susceptible (Zaheer Hussain, 2015). American Psychiatric Association has not officially categorized video game addiction as a disorder, it is acknowledged as a "condition requiring further study" within the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) under category of Internet gaming disorder. (Petry NM, 2014). Specific elements within Online video games, such as the social and competitive aspects of MMORPGs, can contribute to addiction risk. Factors like “sex, age, self-esteem, attention, depressive moods, and family environment” are significantly associated with online gaming addiction (Gi Jung Hyun, 2015). Many individuals play Online video games for “entertainment, to escape reality, and to socialize”. The gamer experience is influenced by various factors, including challenge (Laurence, 2023) and the desire to escape from reality (Chuang-Chun Liu, 2016). Game design elements like virtual item purchases and player recruitment serve as mediators in shaping ongoing gaming intentions. “Enjoyment” emerges as a crucial predictor of gamer experience, closely followed by “arousal, social interaction, escapism, and challenge” (Laurence, 2023).

5. IMPACT OF GAME ADDICTION

Video game addiction has become a prevalent social issue (Sukkyung You, 2015), with studies indicating that male gamers are more likely to be addicted than their female counterparts (Hussain, 2015), (Molde., 2016), (Huanhuan Li, 2016), (José Gómez-Galán, 2021). These addiction patterns often place male gamers in an “intermediate-risk online game addiction class” (Hussain, 2015) or it can be called to be in a category where gameplay serves as a coping mechanism for handling unpleasant emotions and exerting emotional control. Self-esteem and social skills exhibit negative correlations with game addiction, while depression shows a positive correlation. The player's self-perception, known as avatar identification, has been identified as a mediator between depression and game addiction (Ricardo A. Tejeiro Salguero, 2002). Research suggests that factors such as “stressful life events, avoidant coping styles, and neuroticism” contribute to online game addiction, particularly among college students (Huanhuan Li, 2016) Males, in

particular, show a higher incidence of online game addiction, displaying elevated levels of neuroticism and a greater likelihood of using avoidant coping strategies (Huanhuan Li, 2016). The pandemic has further exacerbated video game consumption and addiction, with studies indicating that excessive use of social networks and being male are significant predictors of addiction (José Gómez-Galán, 2021). While massively multiplayer online role-playing games (MMORPGs) can negatively impact students' time management for studying, they do not significantly affect their social life or emotions. Students, despite struggling with managing study time due to excessive gaming, are still able to complete academic tasks, maintain a balanced social life, and control their emotions while engaging in MMORPGs (Rubijesmin Abdul Latif, 2017). Motivations for playing MMORPGs and gender have been identified as key predictors of online gaming addiction. Factors such as the enjoyment of exploring virtual worlds, socializing with other gamers, and participating in casual, friendly guilds significantly contribute to the likelihood of developing an addiction. (Hussain, 2015). The permanent virtual world, advancement systems, and social interaction features of MMORPGs also have addictive potential (Joel Billieux, 2015). Furthermore, being male and young is highly associated with addicted, problem, and engaged gaming. Molde has found that "Video game addiction is negatively associated with conscientiousness and positively associated with neuroticism and Poor psychosomatic health is positively associated with problems and engaged gaming" (Molde., 2016).

6. VIDEO GAME ADDICTION TEST (VAT)

This study utilized the VAT-Video Game Addiction Test to assess the video game addiction levels among the participants. The VAT, derived from a comprehensive questionnaire study in the Netherlands, exhibited strong reliability, construct validity, and a cohesive one-factor structure. Additionally, it demonstrated consistent measurement performance across diverse subgroups. This questionnaire presents a valuable tool for investigating video game addiction and adds to the discourse surrounding the potential inclusion of behavioural addictions in the DSM-V (Antonius J. van Rooij, 2012).

7. THEORETICAL FRAMEWORK

The player engagement model, known as the player engagement process (pep), was created by henrik schoenau-fog from aalborg university, copenhagen (schoenau-fog, 2011). The model describes player engagement as a process involving "objectives, activities, accomplishments, and affect", which sustain player engagement in digital Online video games. (Schoenau-Fog, The Player Engagement Process– An Exploration of Continuation Desire in Digital Online video games, 2011). The model aims to explore the elements that contribute to player engagement in online gaming. The researchers have selected Immersion (graphics, sound, storytelling and narrative), Game mechanics (micro transactions, engaging, balanced, rewarding gameplay), Motivation (achievement, levelling up, unlocking new content, and completing challenges), Social interaction (peer competition, friendships and communities) as the elements and factors that contribute to the player engagement in Online video games. The player engagement model, is a theoretical framework or representation used to understand and optimize the factors influencing player engagement. It involves identifying key elements that contribute to engaging players and creating a structured approach to enhance their overall experience. This could include factors like game mechanics, social features,

rewards systems, and more. Player engagement in Online video games and focuses specifically on the characteristic of continuation desire.

Figure 1

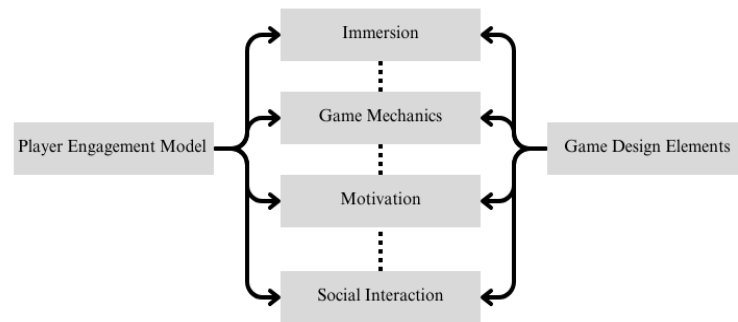


Figure 1

8. HYPOTHESIS

H_0 : Game design elements are not associated with game addiction.

H_1 : Game design elements are associated with game addiction.

Upon testing the assumed hypothesis, the researchers identified game design elements are associated with game addiction, thus accepting the alternative hypothesis H_1 , and rejecting the null hypothesis H_0 .

9. RESEARCH METHOD

This is a quantitative research method. The main goal is to find whether there is an association between game addiction and game design elements. To measure the game addiction levels, the vat scale (Antonius J. van Rooij, 2012) has been used. To measure and assess the impact of game design elements, questionnaires are created using Likert's five-point scale model based on the factors created from the player engagement model. Through simple random sampling, the data is collected in the city of Coimbatore for a total sample size of 309. The collected samples are filtered to 132 people who play Online video games regularly, hence they are used as the primary research samples for this study. The collected data are analysed through IBM SPSS software, chi-square and crosstabulation were done on the data to find association between the variables.

10. DATA ANALYSIS

Association chi-square

Vat with game mechanics	N	Chi-square value	Asymp. Sig. (2-sided)
Immersion	132	21.008a	.000
Mechanics	132	32.093a	.000
Motivation	132	24.034a	.000
Interaction	132	21.696a	.000

The table shows that there is a significant relationship at 5% significance between vat and immersion ($\chi^2 = 21.008a$; $df=1$, $p < .000$), vat and game mechanics ($\chi^2 = 32.093a$; $df=1$, $p < .000$), vat and motivation ($\chi^2 = 24.034a$; $df=1$, $p < .000$), vat and social interaction ($\chi^2 = 21.696a$; $df=1$, $p < .000$). Hence, it is concluded that there is significant association between the vat and other variables such as immersion, mechanics, motivation, interaction.

Cross tabulation

Video game addiction and immersion			Immersion		Total
			Less immersed	Highly immersed	
Vat levels	Less addiction	Count	24	47	71
		% of total	18.2%	35.6%	53.8%
	High addiction	Count	45	16	61
		% of total	34.1%	12.1%	46.2%

According to the table, most individuals with low addiction levels have high levels of video game immersion, while most persons with high addiction levels have lower levels.

Video game addiction and game mechanics			Game mechanics		Total
			Low gm	High gm	
Vat levels	Less addiction	Count	26	45	71
		% of total	19.7%	34.1%	53.8%
	High addiction	Count	52	9	61
		% of total	39.4%	6.8%	46.2%

The table shows that the majority of people with less addiction have high game mechanics, and people with high addiction levels have low video game mechanics.

Video game addiction and game motivation			Motivation		Total
			Low motivation	High motivation	
Vat levels	Less addiction	Count	27	44	71
		% of total	20.5%	33.3%	53.8%
	High addiction	Count	49	12	61
		% of total	37.1%	9.1%	46.2%

According to the table, most individuals with lower levels of addiction have great motivation, whereas those with higher levels of addiction have lower motivation.

Video game addiction and social interaction			Social interaction		Total
			Low social interaction	High social interaction	
Vat	Less addiction	Count	26	45	71

levels	% of total	19.7%	34.1%	53.8%
High	Count	47	14	61
addiction	% of total	35.6%	10.6%	46.2%

The table shows that the majority of people with less addiction have high social interaction levels, while the majority of people with high addiction levels have low social interaction levels.

11. RESULTS

Figure 2

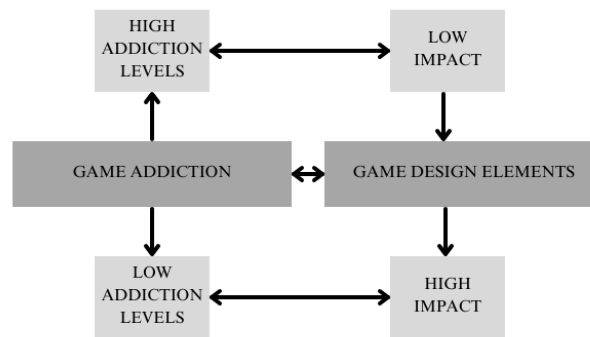


Figure 2

Figure above shows that high levels of game addiction have a low impact on design elements, which implies that people with high levels of addiction don't play Online video games because of the design elements. However, people with low addiction levels have a high impact on video game design elements. Association tests show that there is a significant relationship at 5% significance between vat and immersion ($\chi^2 = 21.008a$; $df = 1$, $p < .000$), vat and game mechanics ($\chi^2 = 32.093a$; $df = 1$, $p < .000$), vat and motivation ($\chi^2 = 24.034a$; $df = 1$, $p < .000$), and vat and social interaction ($\chi^2 = 21.696a$; $df = 1$, $p < .000$). The researchers concluded that the vat has a substantial relationship with other characteristics such as immersion, mechanics, motivation, and interaction. According to the crosstabs, most persons with low addiction levels have high levels of video game immersion, whereas most people with high addiction levels have low levels. Also, we can see that persons with lower levels of addiction have higher game mechanics, whereas people with higher levels of addiction have lower game mechanics. Most people with lower levels of addiction have high motivation levels, whereas those with greater levels of addiction have less motivation levels. Similarly, the majority of persons with less addiction have high levels of social interaction levels, whereas the majority of people with high levels of addiction have low levels of social interaction.

12. DISCUSSION

The researchers found association between video game addiction and game design elements (Joel Billieux, 2015) (Laurence, 2023) researchers have similar

results like social interaction. Although there is an association, our findings indicate that the design elements of Online video games do not directly contribute to the development of video game addiction. Instead, it is evident that individuals with lower levels of addiction place a significant emphasis on video game design aspects such as immersion, game mechanics, motivation, and social interaction. Our analysis reveals that individuals who spend less time engaged in Online video games tend to prioritize the immersive experience, game mechanics, motivation, and social interaction facilitated by game design. Conversely, those categorized as addicted gamers, with extended playtime, show a lack of concern for these design elements. Their primary focus appears to be on finding an activity to keep them occupied, with a consistent pattern across all factors associated with video game addiction. In essence, addicted gamers, irrespective of the specific game design elements, consistently express a lack of interest in the immersive, motivational, and social aspects crafted by game designers. People who are not addicted to Online video games tend to distract easily from games and pulled towards other activities like social media or mobile phone (Thornton, 2014).

13. LIMITATION

The research faces limitations arising from an uneven distribution of data across diverse gaming platforms, genres, and player demographics. Given the varied preferences and engagement levels of individuals, the study may not adequately capture the diversity inherent in the broader gaming community. Constraints related to sample size may restrict the generalizability of results, hindering a more comprehensive exploration of the correlations between player engagement and game design elements. A more extensive and diverse sample would have facilitated a broader understanding of these connections. The study's narrow geographic focus on the city of Coimbatore diminishes its applicability, potentially leading to results that do not accurately represent the overall gaming community. Regional differences and gaming habits may not have been sufficiently considered. Additionally, the utilization of a single-player engagement model should be noted, recognizing that various authors employ different models and factors tailored to their studies (Schoenau-Fog, 2011). The research encountered challenges in obtaining a sufficient number of female samples, resulting in a gender imbalance within the study. Consequently, the findings may not adequately reflect the interests and gaming experiences of female players. Future research initiatives should strive for more equitable gender representation to ensure a comprehensive understanding of game addiction across diverse demographics. Enhancing the external validity of the study requires larger-scale research and a more diverse representation of demographics. Including participants from a wider range of age sets, social and economic backgrounds, and cultural backgrounds would contribute to a more detailed analysis of how game design components impact player involvement. The study overlooks temporal elements, such as emerging gaming trends, technological advancements, and evolving cultural perspectives toward gaming, which could influence game addiction. Recognizing this limitation underscores the importance of ongoing research efforts to stay abreast of changes within the gaming industry.

14. CONCLUSION

The researchers investigated game addiction using the player engagement model, by analysing design elements that influence player engagement on Online video games. The primary goal was to find the association between design elements

and addictive behaviours, and provide valuable insights into the relationship between game design and video game addiction. The researchers discovered patterns and associations by dissecting the various design elements with video game addiction. With this information, game developers, policymakers, and mental health professionals can work together to develop effective strategies for reducing and preventing the dangers of obsessive gaming. As we navigate the rapidly evolving landscape of digital entertainment, it is imperative to strike a delicate balance between creating immersive and engaging gaming experiences and safeguarding against the potential harms associated with addiction. In the future, this knowledge can be used to promote a gaming environment that is both engaging and beneficial to players' health.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

REFERENCES

- A survey of the video game market in 2021. (2023, april 7). retrieved from allcorrectgames.com: <https://allcorrectgames.com/insights/a-survey-of-the-video-game-market-in-2021/>
- antonius j. van rooij, t. m. (2012). video game addiction test: validity and psychometric characteristics. cyberpsychology, behavior, and social networking, mary ann liebert, inc.
- cecilie schou, a. (2015). online social network site addiction: a comprehensive review. curr addict rep , 175–184.
- chuang-chun liu, i.-c. c. (2016). model of online game addiction: the role of computer-mediated. telematics and informatics, 904–915.
- daley, s. (2022, sep 29). gaming, a look into the gaming industry: types of video games and gaming jobs. retrieved from builtin.com: <https://builtin.com/gaming>
- erkan baysak, f. d. (2016). online game addiction in a sample from turkey: development and validation of the turkish version of game addiction scale. taylor and francis group, llc, 1017-7833.
- gi jung hyun, d. h.-s. (2015). risk factors associated with online game addiction: a hierarchical model. computers in human behavior, 706–713.
- grüsser, s. t. (2007). excessive computer game playing: evidence for addiction and aggression? grüsser, s., thalemann, r., & griffiths, m. (2007). excessive computecyberpsychology & behavior : the impact of the internet, multimedia and virtual reality on behavior and society, 10 2, 290-2.
- huanhuan li, y. z. (2016). role of stressful life events, avoidant coping styles, and neuroticism in online game addiction among college students: a moderated mediation model. frontiers in psychology, 1 - 11.
- hussain, z. w. (2015). an exploratory study of the association between online gaming addiction and enjoyment motivations for playing massively multiplayer online role-playing games. computers in human behavior, 221–230.
- joel billieux, j. d. (2015). internet gaming addiction: the case of massively multiplayer online role-playing games. springer-verlag italia, 1516-1524.

- josé gómez-galán, c. l.-p.-l. (2021). exploratory study on video game addiction of college students in a pandemic scenario. *journal of new approaches in educational research*, 330-346.
- kardefelt-winter, r. k. (2018). helping parents make sense of video game addiction. *springer international publishing ag*, 59-69.
- key data on the movie production and distribution industry worldwide in 2022. (2022, june 27). retrieved from statista: <https://www.statista.com/statistics/326011/movie-production-distribution-industry/>
- laurence, a. h. (2023). video game engagement: a passkey to the intentions of continue playing, purchasing virtual items, and player recruitment. *international journal of computer games technology*, volume 2023,13 pages.
- mark d. griffiths, d. j. (2012). video game addiction: past, present and future. *current psychiatry reviews*, 8, 000-000.
- maryam haghbin, f. s. (2013). a brief report on the relationship between self-control, video game addiction and academic achievement in normal and adhd students. *journal of behavioral addictions*, 239-243.
- molde., c. t. (2016). prevalence and predictors of video game addiction: a study based on a national representative sample of gamers. *springerlink*, 672-686.
- petry nm, r. f. (2014). "an international consensus for assessing internet gaming disorder using the new dsm-5 approach". *addiction*. 109, 1399-406.
- ricardo a. tejeiro salguero, r. m. (2002). measuring problem video game playing in adolescents. *society for the study of addiction to alcohol and other drugs*, 1601-1606.
- rubijesmin abdul latif, n. a. (2017). students, impact of online games among undergraduate. *international conference on computing and informatics*, 523-532.
- S. gaetan, a. b. (2014). french validation of the 7-item game addiction scale for adolescents validation franc, aise de la game addiction scale à 7-items pour adolescents. *elsevier masson sas*, 8.
- schoenau-fog, h. (2011). the player engagement process- an exploration of continuation desire in digital games. *proceedings of digra 2011 conference: think design play. denmark*.
- sukkyung you, e. k. (2015). virtually real: exploring avatar identification in game addiction among massively multiplayer onlinerole-playing games (mmorpg) players. *games and culture* , 56-71.
- thornton, b. f. (2014). the mere presence of a cell phone may be distracting. *social psychology*, 45, 479-488.
- top countries/markets by game revenues. (2023, june 27). retrieved from newzoo: <https://web.archive.org/web/20230326135814/https://newzoo.com/resources/rankings/top-10-countries-by-game-revenues>
- weinstein, a. (2010). computer and video game addiction—a comparison between game users and non-game users. *the american journal of drug and alcohol abuse*, 36, 268 - 276.
- zaheer hussain, g. a. (2015). an exploratory study of the association between online gaming addiction and enjoyment motivations for playing massively multiplayer online role-playing games. *computers in human behavior*, 221-230.