Journal of Theoretical and Applied Information Technology
31st December 2019. Vol.97. No 24

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

ONLINE GAMING ADDICTION AMONG ADOLESCENTS IN KUWAIT: PRIVATE SECTOR

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ABSTRACT

The popularity of online gaming has introduced many issues and concepts that former research ascertains such as pathological gaming, gaming disorder and online gaming addiction, as some extreme gamers may exhibit some indications of addiction symptoms that are equivalent to those of more serious pathological addictions like gambling and substance addiction symptoms, as many aspects of their lives can be affected negatively.

This research aims to determine whether adolescents in Kuwait are at risk of being addicted to online gaming while considering gender differences. Additionally, we explore possible correlations between academic performance and online gaming addiction. Problematic online gaming questionnaire (POGQ) was applied on a random sample of 248 adolescent students in their private schools, 158 males and 90 females, whose ages ranged from 10 to 17. Analysis was performed using Confirmatory Factor Analysis (CFA), Latent Profile Analysis (LPA), and statistical analysis.

Keywords: *Health Informatics, Online Gaming, Problematic Online Gaming, Addiction, Adolescents, POGQ*

1. INTRODUCTION

Online gaming started in the 1970's (PCMAG, 2011), as early as the introduction of basic computers, as a part of the technological industry. Video games are a global, fast changing, steadily increasing industry, according to the latest annual Global Games Market Report by data provider Newzoos. There were 2.3 billion active gamers around the world in 2018 from different ages, nationalities and genders, who were expected to generate 137.9 billion (USD) in game revenues. (Newzoo's 2018 Report). According to WEPC (2018), the video game industry, statistics, trend and data report, online gaming traffic worldwide reached 915 petabytes per month in 2016 and is expected to increase by 79% more in 2019 (Cisco Systems, 2017). A decade ago, online video games were only played on consoles such as PlayStation, or Xbox, or on a PC. But now, with the vast development and advancement of mobiles and tablets, everyone and anyone can play anywhere, and anytime they desire to, either offline or online with their devices. Online, interconnected or multiplayer gaming are identified as games played over the internet; online games can be played solo: with friends, you add, or with multiple gamers from all over the world. All the player must do is connect to the internet, log in and start downloading the desired game from any game store, such as the App store, PlayStation store or Microsoft store, etc. The game is then downloaded from a content delivery network connected to the game server through the global IP network, and because online gaming is in real time play the players' device is constantly connecting and exchanging data with the game server. Online games are divided into different genres and types; the most widespread type is the Massively Multiplayer Online Role-Playing Games (MMORPGs), (Kuss, D. J., & Griffiths, M. D., 2012), (Final Fantasy, Elder scrolls) where players fight their way and survive while exploring large areas and fantasy virtual worlds with thousands of other players; also, First Person Shooters (FPS) like (Call of duty, Battlefield), Real Time Strategy (RTS) like Age of Empires, Warcraft, Simulations (e.g. the Sim city), Adventure, Puzzle, Sports, and finally, the 2018 rapid trending genre Battle Royale such as Fortnite, PUBG, which have a huge fan base in Kuwait. Most of these online games offer the option of paying by cash, called real money trade (RMT) (Park, Hee Lee, 2017) to upgrade and strengthen one's character, open new locations, or even buy in game virtual money or gold with real money (microtransactions), which can raise certain concerns and promote commitment to a game.

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

As a video gamer since childhood myself, and as a parent, I know how much gaming in general consumes massive amounts of time and how much it can affect the player. It changes one's mood for the better when wining or for the worse, sometimes when losing. That was while only playing a story-based offline game, but now the most popular and successful game development companies like Rockstar Games and Naughty dog ensure that almost every game they develop comes with an offline and online option, knowing that the latter option gives the game a longer life and more profit from players buying online upgrades, skins and whatnot.

This huge popularity of online gaming has introduced many issues and concepts that previous research has explored, such as pathological gaming, gaming disorder and online gaming addiction, as some extreme gamers may exhibit some indications of addiction symptoms that are equivalent to those of more serious pathological addictions like gambling and substance addiction symptoms, as many aspects of their lives can be affected negatively, which require appropriate treatment (Demetrovics et al. 2012). The World Health Organization in September 2018 acknowledged the seriousness of issues caused by gaming through classifying and including the term gaming disorder in the International Classification of Diseases. (WHO, 2018).

1.1 Defining and categorizing Addiction

The American Society of Addiction Medicine, 2011 (ASAM), has defined addiction as a "Primary, chronic disease of brain reward, motivation, memory and related circuitry. Dysfunction in these circuits leads to characteristic biological, psychological, social and spiritual manifestations. This is reflected in an individual pathologically pursuing reward and/or relief by substance use and other behaviors".

The ASAM has characterized addiction as the "inability to consistently abstain, impairment in behavioral control, craving, diminished recognition of significant problems with one's behaviors and interpersonal relationships, and a dysfunctional emotional response". And like all chronic diseases, "Addiction often involves cycles of relapse and remission". Thus, "without treatment or engagement in recovery activities, addiction is progressive and can result in disability or premature death" (ASAM, 2011).

Addiction can be categorized into substance addiction like drug addiction or non-substance addiction, also known as behavioral addiction. Substance addiction is defined as "neuropsychiatric disorder characterized by a recurring desire to continue taking the drug despite harmful consequences". (Zou, Z., Wang, H., Uquillas, F. D. O., Wang, X., Ding, J., & Chen, H., 2017). And non-substance addiction which means behavioral addiction includes pathological gambling, food addiction, internet addiction, and mobile phone addiction. (Zou, Z et al. 2017).

1.2 Hypothesis and Objectives

Earlier literature showed that adolescent gamers are the most affected from online gaming (Ko, C., Yen, J., Chen, C., Chen, S., & Yen, C., 2005), and (Kuss, D. J., & Griffiths, M. D., 2012). Thus, this study targets young online gamers in Kuwait aiming to investigate the validity of the hypothesis that states that:

1. Adolescents in Kuwait, both males and females, are at risk of being addicted to Online gaming.
2. Online gaming addiction risks are higher in males than in females.
3. Online gaming is negatively affecting the academic performance of adolescents in Kuwait.

By collecting their answers to the problematic online gaming questionnaire (POGQ) developed by (Demetrovics Z, et al., 2012). Research shows that online gaming is an addiction when it causes symptoms in the player similar to substance or gambling addictions, which include, according to the OPGQ: preoccupation, overuse, immersion, social isolation, interpersonal conflicts, and withdrawal (Demetrovics Z, et al., 2012). This evidence requires further research in our Kuwaiti society's gamer community, as no academic study exists that explores this field; thus, this study is considered a first phase for further studies in this area. In this study we mainly intend to achieve the following objectives:

1. To determine whether adolescents, both males and females, in Kuwait are at risk of being addicted to online gaming or not.
2. Compare online gaming addiction risks among adolescents in Kuwait based on gender difference.
3. Discover if there is a negative correlation between the students' academic performance and excessive online gaming.
4.

1.3 Preliminary results and discussions

We have established exploratory group discussions with 26 male adolescents in their class in a public school about how much they know

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

about online gaming, and how many of them play online games. It turned out that the majority of the class, 21 students, play online games and are familiar with the same famous online games. Their circle of friends and family members also play online games; thus, strengthening the theory of the possible existence of online gaming addiction risks among adolescents and emphasizing it.

On the contrary, in an offline game with a beginning and an ending where one can achieve all missions or objectives and finally put it aside, online games have no ending; players continue to explore new areas, meet new people, achieve goals, and find new regenerated objectives to accomplish, while the game companies keep updating their games online. Also, online games stimulate rivalry and competition. For example, most of us remember how simple online games such as Fun Run, or Pokémon Go in the past few years have swiftly become successful phenomena. Online games always urge the player to return to the game with these features. With the rapid development and competition between game development companies these features continue to improve; hence, the creation of the new genre of online gaming called Battle Royal, for these features and more online games have attracted over two billion international players (Newzoo, Global Games Market Report, 2018).

Aimed to test the relevancy and the measurement invariance of the Problematic Online Gaming Questionnaire (POGQ) in online and offline gamers, and the differences between them, an article entitled Online and offline video game use in adolescents: measurement invariance and problem severity, from The American Journal of Drug and Alcohol Abuse, by (Smohai, et.al 2016), targeted a sample of 1,964 (71% male) adolescent videogames and the results prove that online gamers are more exposed to score higher on overuse, interpersonal conflict, and social isolation; thus, indicating that online and offline gaming have different impacts on problematic use, where online gaming is more addictive.

Online gaming immerses the player in a virtual like experience where one creates a duplicate of himself as an avatar and live in a different world with thousands of players from all over the globe, escaping one's reality and having a pleasant, challenging and engaging time. Video and computer gaming have existed for a long time, and players are increasing each year as devices and games are becoming more advanced, attractive, and more mobile. Nowadays, no one can disagree that even our children are constantly glued to their devices whether they are consoles, tables, or mobiles; this availability of connected devices and conveniences has led to numerous problems such as online gaming addiction as earlier literature suggests (Kuss, D. J., & Griffiths, M. D., 2012).

A 2017 study entitled, "Addiction to Internet Use, Online Gaming, and Online Social Networking Among Young Adults in China, Singapore, and the United States" found in the Asia Pacific Journal of Public Health by Tang, C. S., Koh, Y. W., & Gan, Y., (2017, used the short form of the problematic online gaming questionnaire to identify the range of online gaming addiction. Their results demonstrated that from a total of 3267 undergraduate students (1440 males, 1827 females) between 18 and 25 years, a total of 20.9% are considered online gaming addicts, and that male students were more addicted to online gaming than females, whereas the rates were 31% for male students and 13.1% for female students.

The research (Considering the Definition of Addiction) by Sussman, S., & Sussman, (2011), published in the International Journal of Environmental Research and Public Health, has made a systematic electronic literature review of the concept of addiction. To explore the definition of addiction through a literature search of 52 studies, they found that the elements of addiction are: "(a) engagement in the behavior to achieve appetitive effects, (b) preoccupation with the behavior, (c) temporary satiation, (d) loss of control, and (e) suffering negative consequences" (Sussman, S., & Sussman, 2011).

Online gaming addiction is categorized as a behavioral addiction (Griffiths MD). An expert researcher argued that technological behavioral addictions have existed since 1995, and since then studies and research have increased on this topic. A 2015 study entitled, "How Has Internet Addiction Research Evolved Since the Advent of Internet Gaming Disorder? An Overview of Cyberaddictions from a Psychological Perspective" by Lopez-Fernandez, O., studied the scientific literature regarding Internet Addiction, and compared between cyberaddictions; his results showed that addiction to video games and online games was the second most studied technological addiction after internet addiction. This proves the importance of the concept of online gaming addiction to the academic world, and how widespread it is. In Taiwan, online gaming has proved to be the most popular internet activity among Taiwanese adolescents. Most of the online gaming addiction studies have targeted young adolescents as they consistently represent the

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

majority of online gamers, and male adolescent players are considerably more numerous than female adolescent players. (Ko, C., Yen, J., Chen, C., Chen, S., & Yen, C., 2005).

Very recently in mid-2018, the International Classification of Diseases (ICD-11) defined gaming disorder or gaming addiction as online or offline, digital or video gaming that is depicted or described as uncontrollable gaming that prioritizes gaming over everything else, and the persistence of gaming despite knowing the presence of negative effects. And to diagnose gaming disorder some behaviors must be present and corresponds with specific severity that it causes deterioration in a gamer's different and important aspects of life in at least one year. This recent addition of the term gaming disorder as a disease will help countries with their nation-wide health plans and orientations towards disorders (WHO, 2018).

The importance of the topic of online gaming addiction is that the effects and symptoms of being addicted to online gaming are similar to those of gambling and substance addictions (Demetrovics Z, et al. 2012). Also, there are increasing risks of failure in important life aspects like failure in school or college, or losing a job, or even a partner in a marriage (Pontes, H. M., & Griffiths, M. D., 2015). These symptoms and risks would require a professional therapeutic treatment of its own.

In pursuit of diagnosing online gaming addictions after becoming a concern, researchers have aimed to develop and validate scales that determine whether a gamer is addicted or not. So, in this section we have summarized and compared the most well-known pathological gaming scales in order to choose the most appropriate scale to apply here in Kuwait to achieve the objectives of the study.

2. COMPARATIVE LITERATURE OF THE MOST WELL-KNOWN PATHOLOGICAL GAMING SCALES

2.1. Diagnostic and Statistical Manual (DSM)

The diagnostic and statistical manual (DSM) on substance dependence or pathological gambling criteria was created by the American Psychiatric Association (2000). It was developed to classify mental disorders, and it acknowledges six components of addiction: silence, mood modification, tolerance, withdrawal symptoms, conflict and relapse. Thus, it is reasoned that any behavior that fulfills these six criteria would be declared an addiction. Mainly, the DSM scale compares the symptoms and behaviors of gambling and substance addiction to gaming addiction and studies where and how they correspond.

However, the DSM criteria may not be accurate as they are not yet validated psychometrically for the assessment of online gaming addiction prevalence. (Hussain, Griffiths, Baguley, 2011). Also, the DSM scale cannot be applied here in the Kuwaiti culture, as gambling and substance use are both legally and religiously prohibited and considered a sensitive and a taboo topic, making it inappropriate to expose to adolescents in Kuwait.

2.2. Pathological Video Gaming Scale (PVGS)

The Pathological Video Gaming Scale is a 10-item scale created by Gentile, (2009) based on the Diagnostic and Statistical Manual (DSM) criteria for pathological gambling. The same characteristics and conclusions of the (DSM) scale apply to the (PVGS), which are how the DSM scale compares the symptoms and behaviors of gambling and substance addiction to gaming addiction and how they correspond. Also, as previously mentioned, the DSM criteria are not yet validated psychometrically for the assessment of online gaming addiction prevalence. (Hussain, Griffiths, Baguley, 2011).

2.3. Game Addiction Scale (GAS)

The Gaming Addiction Scale (GAS) was created by Lemmens, and validated psychometrically by Lemmens, Valkenburg, and Peter (2009), to measure and assess game addiction through a seven-item scale: salience, tolerance, mood modification, relapse, withdrawal, conflict, and problems. This GAS scale was cited by many researchers and used in interviews and questionnaires on a five-point Likert scale. Bear, et al. (year?) utilized the GAS on computer games beside console games and named it the CGAS, Computer/Gaming-station Addiction Scale (2011) and employed the GAS seven items on adolescents and their parents to answer. Finally, this scale would only be appropriate for studies targeting parents and their young adults.

2.4. Internet Addiction Scale (IAS)

Also known as Internet Addiction Test (IAT), it is a 20-item diagnostic scale by Dr. Kimberly Young (1996) created to determine whether internet users are heavily using the internet in general in a self-harming manner to the extent of

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

satisfying the term addiction through a five-point Likert scale. We cannot apply Young's Internet Addiction Scale in this study as we are aiming specifically for online gaming addiction, not solely internet addiction. Also, according to Griffiths MD, (2014), Young's (IAS) scale has not been validated.

2.5. IGDS-SF9

A nine-item scale developed from the DSM-5 Internet Gaming Disorder (IGD), in 2014 by Hally M. Pontes and Mark D. Griffiths, was purposed to facilitate and unify research in the field of online gaming disorders. The IGDS-SF9 uses a 5-point Likert scale, to study online and offline gaming activities, and its criteria are nine: preoccupation, withdrawal, tolerance, uncontrollability, loss of interest on everything other than online gaming, excessive online gaming while knowing the disadvantages, lying about the amount of time gaming to others, using online gaming to escape bad moods, and finally, taking the risks of losing people, or jobs for the sake of online gaming. This scale, though reliable, validated and recent, cannot be applied as the literature on it is scarce and according to the authors, needs additional studies because it is still new.

2.6. Problematic Online Gaming Questionnaire (POGQ) - Long Form

After conducting a comprehensive literature review the authors (Demetrovics Z, Urban R, Nagygyorgy K, Farkas J, Griffiths MD, et al., 2012) in their research study entitled, The Development of the Problematic Online Gaming Questionnaire (POGQ), aimed to design a questionnaire that is unlike any other type of scale. It assesses problematic gaming and fits all types of target audiences of players of all gaming genres, as previous literature had the limitations of targeting players of only a specific genre of gaming such as the popular Massively Multiplayer Online Role-Playing Games (MMORPG) audiences. Also, Griffiths MD, (2014) argues that most scales used in current research are based on other questionnaires without being psychometrically validated or reliability and validity tested such as Young's Internet Addiction Test, pathological gambling (DSM), and behavioral addictions.

The Problematic Online Gaming Questionnaire (POGQ) is a 26-item questionnaire that took into consideration all the requirements and criteria of a successful measurement tool that, according to Dr. Koronczai, (2011) are six; comprehensiveness, brevity, reliability and validity for different methods of data collection, for different age groups, and for cross-cultural; finally, a measurement must have been validated on clinical samples. (Griffiths MD, 2014). These six requirements were met through the study entitled (The Development of the Problematic Online Gaming Questionnaire (POGQ) by (Demetrovics Z, et al. (2012), that targeted 3415 gamers and was published in the journal PLoS ONE. As one of the newest developed scale and the previous mentioned substantial reasons the Problematic Online Gaming Questionnaire (POGQ) was chosen as the most suitable measurement tool to be utilized in this study for assessing online gaming addiction among Kuwaiti adolescents.

2.7. Factors associated with internet addiction

2.7.1. Sociodemographic Variables

Online gaming and internet addiction are associated with socio-demographic factors, although different studies have different findings. However, a review of different studies reveals much inconsistency in the relationship between these variables and internet addiction. For example, the study by Kuss, et al., (2014) reports that among adolescents, internet addiction can be associated with different socio-demographic variables, which include high family income, male gender, being in secondary school and being left behind. On the other hand, the findings of Sushm, et al., (2018) report that no significant relationship exists between the socio-demographic factors and internet addiction. At the same time, Kapahi, et al., (2013) stated that age is one of the determining factors of internet addiction, though it is not specific to any gender. However, (Christos et al., 2009) states that the sociodemographic factors such as gender differences among adolescents is positively related to internet addiction and asserts that (Ali, et al., 2012) challenges by stating that gender does not contribute to internet addiction.

2.7.2. Psychosocial factors

A review of different literature shows that research on internet addiction has mainly focused on psychological variables as the main aspects that contribute to internet addiction among young people. Most of the available studies have used college and university students as the main samples to study the level of their internet addiction and gaming. Psychosocial factors in modern society include internal aspects such as lack of confidence, loneliness, use for mood regulation, low life satisfaction and negative life incomes Griffin (Kuss et al. 2014). According to a study conducted by Hasan and Salar (2012), a significant relationship exists between the psychological disorders with the

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

addiction to the internet while the study by Kutty and Sreeramareddy (2014) reports a weak relationship between the same. Adolescents who have higher psychosocial problems such as harm avoidance, low self-esteem, leisure boredom, and introversion are highly likely to become addicted to internet gaming. According to Ryan, et al, (2006), based on SDT, the motivation of players is mainly concerned with online games that satisfy their psychosocial needs. In this case, psychological factors may be said to have a significant impact on online gaming addiction among adolescents. Therefore, the psychosocial context among adolescents is likely to increase the risk to become addicted to online gaming because the exposure to certain behaviors leads to the modification of behaviors.

2.7.3. Comorbid Symptoms

Comorbid symptoms include alcohol and substance use, suicidal ideation, social phobia, antisocial behaviors, and psychoticism, among others, some of which have been associated with internet addiction (Griffin, M. L., Kolodziej, M. E., & Weiss, R. D., 2009). Researchers state that people dealing with any addiction have at least one comorbid mental problem, which might have adverse impacts on the overall health and behavior of an individual (Ryan, et al. 2006). Even though comorbidity is a well-known condition among people dealing with substance addiction, there is less information on its relationship to non-substance abuse such as internet addiction. A study conducted by Ruhr University in Germany concluded that people dealing with internet addiction and online gaming have diagnosable symptoms with nearly 70% of the participants showing symptoms of depression and others having an anxiety disorder. Finally, conditions such as lack of energy, weakened immunity, physiological, and poor health condition is also linked to excessive and problematic use of the internet (Kuss, et al. 2014).

2.7.4. Internet use variables

According to Ling, et al (2011), tasks and activities related to the online environment such as online working and distance learning may have a significant impact on internet addiction among the young generation. Internet use variables such as age of first-time exposure, frequency of internet use, use of the internet for entertainment, internet access and the use of online gaming, among others, have been found to be associated with internet addiction (Kuss, et al. 2014). Most young people around the world who have easier access to the internet are more likely to establish online relationships, which might lead to online gambling and gaming, and as stated by Iqbal and MIAN (2014), students who use the internet approximately 35-hours weekly tend to be addicted to online gaming. Additionally, smartphones have also been reported to contribute to online gaming addiction among adolescents as these devices provide them with a wide range of games and applications such as media entertainment.

3. RESEARCH METHODOLOGY, RESULT AND FINDINGS

4.1. Approach and Methods

Choosing the appropriate approach and methodology for this research was based on a reading summary in the form of a table of each scale developed over previous years to analyze and diagnose the nature of gamers' gameplay, and then choosing the most appropriate one. The most well-known scales are the Diagnostic and Statistical Manual (DSM) by the American Psychiatric Association (2000), and the Pathological Video Gaming Scale (PVGS) by Gentile (2009); the Gaming Addiction Scale (GAS) by Lemmens, (2009); the Internet Addiction Test (IAT) scale by Dr. Kimberly Young (1996), and finally, the scale we chose for this study, the Problematic Online Gaming Questionnaire (POGQ) by Demetrovics Z, et al., (2012). POGQ 26-item questionnaire, is a tool that offers four benefits: (1) it assesses problematic gaming and fits all types of target audiences of players of all gaming genres; (2) it has been psychometrically validated and reliability and validity tested; (3) It satisfied all the requirements and criteria of a successful measurement tool that, according to Dr. Koronczai, (2011) are six: comprehensiveness, brevity, reliability and validity for different methods of data collection, for different age groups, and for cross-cultural; finally, a measurement must have been validated on clinical samples (Griffiths MD, 2014). These six requirements were met through the study, The Development of the Problematic Online Gaming Questionnaire (POGQ) by Demetrovics Z, et al., (2012), that targeted 3415 gamers and was published in PLoS ONE journal. (4) The (POGQ) is one of the newest developed scales and is the best fit for the Kuwaiti culture.

For these substantial reasons, the POGQ was chosen as the most suitable measurement tool to be utilized in assessing online gaming addiction among Kuwaiti adolescents. The first step was to consider the most suitable place, with the most suitable candidates for achieving the study's goals,

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

so three neighboring private schools were nominated to distribute the POGQ among their middle and high school students, but an agreement was needed to present to the school principals. To obtain the agreement a consent was taken personally from Dr. Abdelmehsen Al-Howelah, the manager of The Public Administration for Private Education in Kuwait, in the form of a formal consent paper containing each suggested private school name. Moreover, each headmaster and principal were given the consent.

The second step was to collect and gather data from the adolescent gamers themselves through employing the POGQ, a total sample of 334 male and female students, ages ranging between 10 and 17, participated in answering the POGQ; however, for the results to be accurate, 92 of the questionnaires were excluded from analysis because of incompleteness and biased answers; therefore, the total sample was 248.

After gathering all the required information needed to achieve the objectives, a confirmatory factor analysis, latent profile analysis (LPA), and statistical analysis are applied to analyze the results.

3.2. Methods

3.2.1. Confirmatory Factor Analysis

"Confirmatory factor analysis (CFA) is a multivariate statistical procedure that is used to test how well the measured variables represent the number of constructs" (Statistic solutions, 2013).

Reliability of constructs was calculated using composite reliability (omega coefficient). A value greater than 0.6 was considered satisfactory. The convergent validity of the constructs was measured using the Average Variance Extracted (AVE) which should be close to or higher than 0.5 for all constructs. Divergent validity was met if none of the correlations between latent factors was greater than square root of the AVE for the latent factors. Confirmatory factor analysis was performed using robust maxim likelihood. Goodness of fit was assessed using various parameters (CFI, TLI, P close, RMSEA and SRMR) with thresholds previously defined in the literature . These thresholds are shown in Table 2.

3.2.2. Latent Profile Analysis (LPA)

A latent profile analysis was performed on the dimensions of POGQ. Profile Analysis "helps researchers to identify whether two or more groups of test takers show up as a significantly distinct profile. It helps to analyze patterns of tests, subtests, or scores" (Statistical Solutions, 2013). While latent classes are "Those observed variables that are derived from the unobserved variables, they divide the cases into their respective dimensions in relation to the variable" (Statistical Solutions, 2013).

Thus, various solutions (up to six classes) were compared using various criteria (AIC, BIC, entropy, bootstrapped likelihood ratio test and sample-size adjusted BIC). Varying variances and covariances were assumed when performing LPA since factors did not show equal variances and the covariance between factors ranged from 0.2 to 0.8.

3.2.3. Online gaming behavior across males and females

Scores were calculated for various POGQ dimensions. Unpaired t-test, a "statistical technique that is used to analyze the mean comparison of two independent groups" (Statistics Solutions, 2013), compared the mean scores across males and females to assess whether the problematic gaming behavior was significantly different between them.

3.2.4. Online gaming behavior and academic performance

Spearman's Correlation, which measures "the strength and direction of association between two ranked variables," (Laerd Statistics, 2018) was used to assess the association between the six dimensions of POGQ and self-reported academic performance. Spearman's Correlation was used since academic performance is ordinal in nature (grades A through D).

3.2.5. Statistical analysis

Statistical analysis was performed using R studio v 1.1.149. Factor analysis and latent profile analysis were performed using Lavaan and tidyLPA packages, respectively. Unpaired t-test and Spearman's Correlation were performed at 0.05 significance level. Two-tailed hypothesis testing was also performed.

4. RESULTS

4.1. Descriptive statistics

The final dataset included responses from 248 adolescents.

More than half of the participants were males (n = 158, 63.7%). Participants aged 10 – 13 and 14 -17 years represented 47.6% (n = 118) and 52.4% (n = 130) of the participants, respectively. Most of the participants were living with their father and mother (n = 232, 93.5%). The average academic performance score was A for 129 (52%) of the participants, and B for 84 (33.9%) of them. The most played online games type was Battle Royal with (n = 144, 40%), which is consistent with what we notice in our community now considering

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

the excessive playing of Fortnite and PUBG among adults, adolescents and children. The second type was First Person Shooters for (n = 78, 21.67); the third most played genre was Adventure (n = 35, 9.72). This order of the most played online games shows a significant difference between 2019 and approximately 10 years before, which in most studies showed that MMORPGs was the most played type of online games as mentioned in the literature. Nearly half of the participants (n = 105, 42.3%) did not spend any money on online gaming. Most of the participants spent 1-4 hours playing online games per day (n = 167, 67.6%). Online gaming frequency varied between participants: 78 (31.5%) played online games 1-2 days/week, 60 (24.2%) played online games 3-4 days/week, 62 (25%) played almost every day and 48 (19.4%) played daily. In comparison with some of the descriptive statistics on The development of the online gaming questionnaire study by Demetrovics Z, et al (2012) on Hungarian gamers, they had a sample composed of a majority of students (61.9%), with males composing 90%, and nearly half of them spending money on gaming, which is reasonable because the mean age in their study was 21 years, so they are independent adults, while this study's participants' ages ranged from 10-17; thus, being this young and not yet financially independent approximately half of them did not spend money on gaming.

4.2. Confirmatory Factor Analysis

4.2.1. MODEL FIT

Results show that the six-factor solution was a good fit for the data (CFI 0.948, TLI 0.932, GFI 0.945, SRMR 0.051, RMSEA 0.059, 90% CI 0.045 – 0.072, C min 1.193 P close 0.276).

4.2.2. Composite Reliability (CR)

Composite reliability was greater than 0.6 for all factors and this was deemed acceptable (Table 4).

4.2.3. Convergent and divergent validity

The AVE was around 0.5 for all factors (except factors 2 and 3). Composite reliability (assessed using Omega coefficients) was greater than 0.6 for factors. Discriminant validity was assessed by comparing the square root of the AVE for each factor to its correlation with the other factors. The square root of the AVE for each factor was greater than, or nearly equal to, its correlation with any of the remaining factors, which indicates that the criterion for discriminant validity was met.

Results show that all items (except item 12) had a loading greater than 0.4 on their respective factor. The correlations between factors ranged from 0.25 to 0.87.

4.3. Factors Labeling

Factors were named as previously defined by the POGQ authors : The first dimension was named preoccupation. The second dimension included items related to the excessive use of online games and was defined as overuse. The third factor was named immersion and the fourth factor was social isolation. The fifth dimension referred to overuse of online games and related conflicts. Thus, this factor was named interpersonal conflicts (IC). The sixth factor was concerned with withdrawal symptoms and their manifestations and was termed withdrawal.

4.4 Latent Profiles Analysis

Results show that the three-class solution provided the lowest AIC, BIC and SAIBC compared to the two and four class solutions. The bootstrapped likelihood test result showed that the two-factor solution was not significantly different from the three-class solution. The entropy was higher for the three-class solution compared to the four-class solution. The two-class solution had the highest entropy, but the three-class solution also provided an adequate level of entropy. Thus, a three-class solution was used.

Latent profile analysis showed that participants can be classified into three groups: lower than average risk (n = 25, 10%), average risk (n = 143, 57.7%), and higher than average risk (n = 80, 32.26%). The features of each class are presented in Figure 2. Profile 3 included participants who scored below average across all factors in the POGQ. Profile 1 included participants with POGQ scores slightly below or equal to average POGQ scores.

Profile 2 included participants with scores greater than the average POGQ scores. This profile represents individuals who are at above-average risk of problematic use (n = 80, 32.26%). Further analysis of the above-average risk groups shows that withdrawal was the highest scoring factor. These results suggest that 32.26% of adolescents are at higher risk of problematic gaming behaviour compared to the average risk seen in the Kuwaiti adolescents. However, in the study by Demetrovics Z, et al (2012), results showed that 47.8% of their total sample scored below the average risk, while 15.2% represented medium risk, and 3.4% represented a high risk of problematic gaming. This difference in results with our study could be due to several factors such as year of study differences, as there is considerable time gap between studies, whereas vast changes have occurred in the online

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gaming genre, especially the creation of the new battle royal system.

Another possible factor is the difference in the target audiences' mean age. In addition, it could be because of nationality (Hungarian gamers vs gamers in Kuwait), or the number of the participants.

4.5. Determination Cut-Off Score To Be Classified A Problematic gamer

Based on membership in the above-average risk groups as a ''gold standard'', the sensitivity, specificity, PPV as well as NPV, and accuracy of the POGQ at all possible cut-off points were calculated. Based on this analysis, a cut-off score of 31/32 points was used as an ideal cut-off to be classed as having a higher than average risk of being a problematic gamer. The specificity is 93.3%, while sensitivity is 92.3%. NPV in this case is 89.9%, while PPV is 94.96%. These results show that a cut-off total score of 31/32 can be used to identify participants who are at above average risk of problematic gaming behaviour.

4.6. Online Gaming Behavior Across Males And Females

Results show that the mean preoccupation score was significantly higher in males compered to females (0.17 vs. -0.3, $P < 0.001$) which indicates that males are more preoccupied with online gaming compared to females. The mean score for the remaining dimensions was not significantly different between males and females.

4.7. Association Of Online Gaming With Academic Performance

Results show that there is a statistically significant association between academic performance and all six POGQ dimensions. There was a statistically significant negative association between preoccupation and performance ($r = -0.15$, $P = 0.017$). This indicates that performance increases as preoccupation decreases.

Overuse, immersion, and social isolation also showed a statistically significant negative association with academic performance ($r = -0.324$, 0.226 and 0.22, respectively). Interpersonal conflicts and withdrawal also showed a statistically significant negative association with academic performance ($r = -0.231$, and -0.178, respectively). These results show that problematic gaming behaviour (higher scores on the POGQ) is associated with lower academic performance.

5. CONCLUSION

As video games, including online games, nowadays are aimed at everyone, a study targeting a large scale of online gamers in Kuwait including adults would greatly benefit the area of online gaming addiction research, as many examples of adult Kuwaiti gamers are actively creating online content about all kinds of gaming topics around various social media tools. They are regularly followed by large audiences and are internationally acknowledged by video game companies by being invited to the most important gaming events around the world.

Despite the huge activity of Arab gamers on social media, the Arab and gulf countries' research on this area of study is limited, or nearly non-existent. Literature from Arab and Gulf countries have not been found so far on online gaming addiction; instead, it was mainly only about Internet, social media or mobile addictions in general.

As this study aimed at a limited small sample, it does not represent the whole Kuwait population, so future work would include targeting a larger scale of online gamers of all ages by utilizing an online survey promoted by social media, including influential Kuwaiti online gamer accounts. In addition, future research could more comprehensively address gender differences, positive and negative psychological effects of online gaming by adult gamers and adolescent gamers and how they correlate or differentiate. Additional research could focus on the effects on many aspects of their lives such as social life, parents, marital life, job, school, college in order to find suitable solutions in our community for the behavioral addiction – online gaming addiction – especially that this study concluded that the percentage of adolescents in Kuwait had a higher than average risk of online problematic gaming at 32.26%.

In conclusion, three of the suggested theories of this study are met, as the problematic online gaming questionnaire final analysis results showed that only 10% of the participants were at low risk. While 57.7% of them are at an average risk of online gaming addiction, and 32.26% are at an even higher risk, which is alarming and proves the existence of online gaming addiction risks among adolescents in Kuwait. The results also indicate that males are more preoccupied with online gaming compared to females, and have a higher risk of addiction, which agrees with most literature in this field. In terms of academic performance, results show that problematic gaming behavior (higher scores on the POGQ) is associated with lower academic performance.

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These results indicate that we have a responsibility towards online gamers who are at risk, to educate and spread awareness about the power and control that online games can place upon them before they become addicted and become problematic gamers. As online gaming addiction has the same symptoms of substance addiction, even though it is a behavioral addiction, it must be rightfully diagnosed and treated, especially if it is affecting the quality of a persons' life negatively.

I hope that this research would encourage and benefit further research in the Arab and gulf countries to compare and use the different problematic gaming scales on their societies, and further expand the knowledge and experiences regarding the area of problematic online gaming, especially considering the large number of online gamers in our region.

REFRENCES:

[1] BIBLIOGRAPHY American Society of Addiction Medicine. (2018.). Retrieved from https://www.asam.org/resources/definition-of-addiction

[2] Ali Mostafaei & Marouf Khalili. (2012). The relationship between internet addiction and mental health in male and female university students. *Annals of Biological Research*, Vol. 3, No.9, pp. 4362-4366.

[3] Christos C. Frangos, Constantinos C. Frangos and Apostolos D. Kionos. (2009). Internet Addiction Among Greek University Students: Demographic Associations with the Phenomenon, Using the Greek Version of Yong's Internet addiction Test. *International Journal of Economy Science and Applied Research*. Vol.3, No.1, pp. 49-74.

[4] Demetrovics, Z., Urbán, R., Nagygyörgy, K., Farkas, J., Griffiths, M. D., Pápay, O., Oláh, A. (2012). The Development of the Problematic Online Gaming Questionnaire (POGQ). *PLoS ONE*, 7(5).

[5] Griffin, M. L., Kolodziej, M. E., & Weiss, R. D. (2009). Measuring principal substance of abuse in comorbid patients for clinical research. *Addictive behaviors*, 34(10), 826-829.

[6] Iqbal, M. W., & MIAN, N. A. (2014). Analysis of Internet addiction amongst university level students. *VFAST Transactions on Software Engineering*, 3(2), 11-16.

[7] Kuss, D., D Griffiths, M., Karila, L., & Billieux, J. (2014). Internet addiction: a systematic review of epidemiological research for the last decade. *Current pharmaceutical design*, 20(25), 4026-4052.

[8] Kapahi, A., Ling, C. S., Ramadass, S., & Abdullah, N. (2013). Internet addiction in Malaysia causes and effects. *iBusiness*, 5(02).

[9] Kuss, D. J., & Griffiths, M. D. (2012). Online gaming addiction in children and adolescents: A review of empirical research. *Journal of Behavioral Addictions*, 1(1), 3-22.

[10] Kutty, N. A., & Sreeramareddy, C. T. (2014). A cross-sectional online survey of compulsive internet use and mental health of young adults in Malaysia. *Journal of family & community medicine*, 21(1).

[11] Ko, C., Yen, J., Chen, C., Chen, S., & Yen, C. (2005). Gender Differences and Related Factors Affecting Online Gaming Addiction Among Taiwanese Adolescents. *The Journal of Nervous and Mental Disease*, 193(4), 273-277.

[12] Lopez-Fernandez, O. (2015). How has Internet addiction research evolved since the advent of Internet Gaming Disorder? An overview of cyberaddictions from a psychological perspective. *Current Addiction Reports*, 2(3), 263-271.

[13] Ling, C. S., Ramadass, S., Altaher, A., & Arjuman, N. C. (2011, December). Malaysian internet surfing addiction (MISA): Factors affecting the internet use and its consequences. In Computer applications and industrial electronics (iccaie), 2011 *IEEE international conference* on (pp. 585-590).

[14] Newzoo's 2018 Report: Insights Into the $137.9 Billion Global Games Market. (n.d.). Retrieved from https://newzoo.com/insights/articles/newzoos-2018-report-insights-into-the-137-9-billion global-games-market/

[15] Park, B., & Lee, D. H. (2017). The Interplay between Real Money Trade and Narrative Structure in Massively Multiplayer Online Role-Playing Games. *International Journal of Computer Games Technology*, 2017, 1-8.

[16] Pontes, H. M., & Griffiths, M. D. (2015). Measuring DSM-5 Internet gaming disorder: Development and validation of a short psychometric scale. *Computers in Human Behavior*, 45, 137-143.

[17] Ryan, R. M., Rigby, C. S., & Przybylski, A. (2006). The motivational pull of video games: A self-determination theory approach. Motivation and emotion, 30(4), 344-360.

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

[18] Smohai, M., Urbán, R., Griffiths, M. D., Király, O., Mirnics, Z., Vargha, A., & Demetrovics, Z. (2016). Online and offline video game use in adolescents: measurement invariance and problem severity. *The American Journal of Drug and Alcohol Abuse*, 43(1), 111-116.

[19] Spearman's Rank-Order Correlation. (n.d.). Retrieved from https://statistics.laerd.com/statistical-guides/spearmans-rank-order-correlation-statistical-guide.php

[20] Sussman, S., & Sussman, A. N. (2011). Considering the Definition of Addiction. *International Journal of Environmental Research and Public Health*, 8(10), 4025-4038.

[21] Tang, C. S., Koh, Y. W., & Gan, Y. (2017). Addiction to Internet Use, Online Gaming, and Online Social Networking Among Young Adults in China, Singapore, and the United States. *Asia Pacific Journal of Public Health*, 29(8), 673-682.

[21] Zou, Z., Wang, H., Uquillas, F. D. O., Wang, X., Ding, J., & Chen, H. (2017). Definition of Substance and Non-substance Addiction. *In Substance and Non-substance Addiction* (pp. 21-41). Springer, Singapore.

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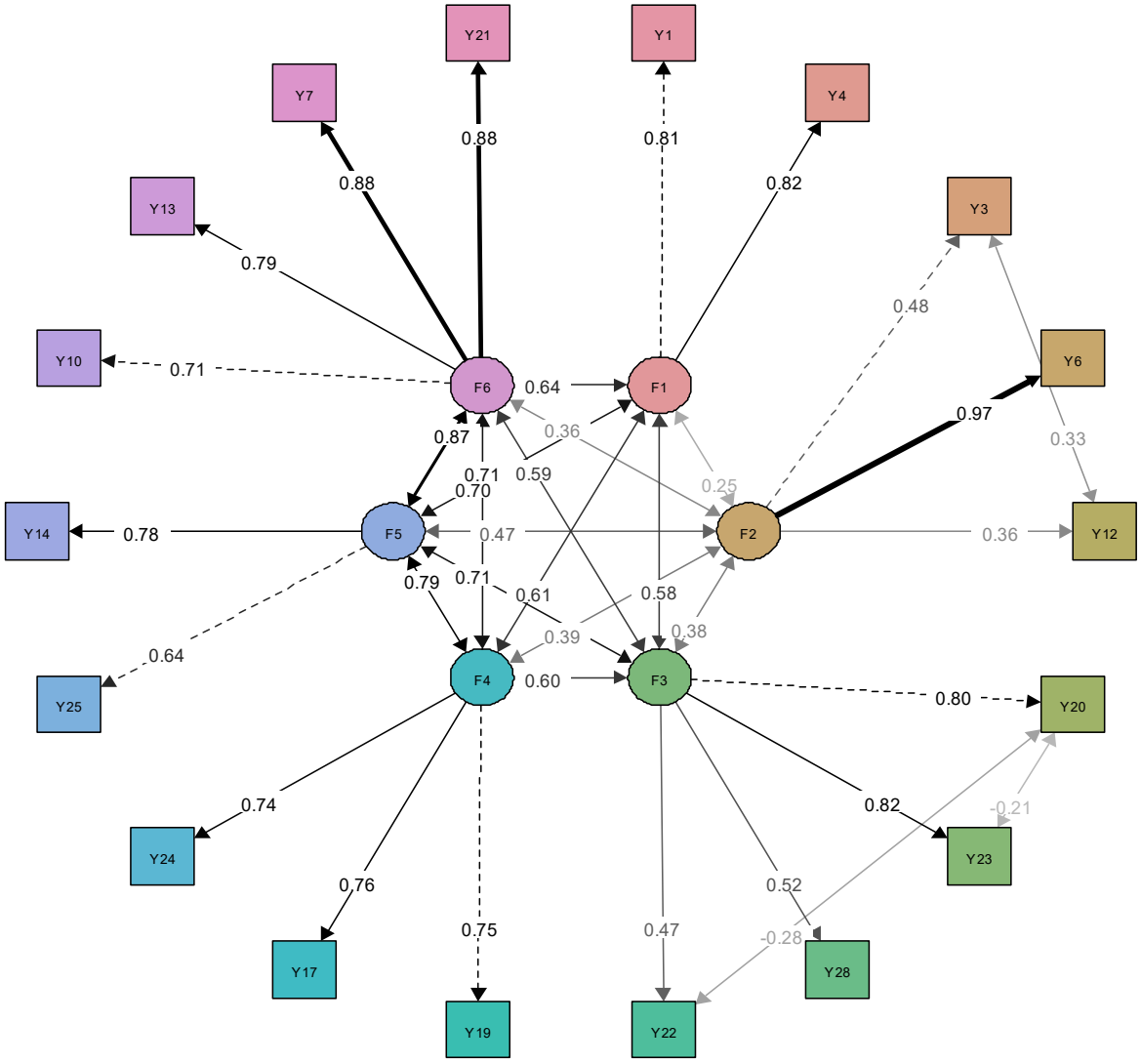

Figure 1. Loadings And Correlations Between Factors

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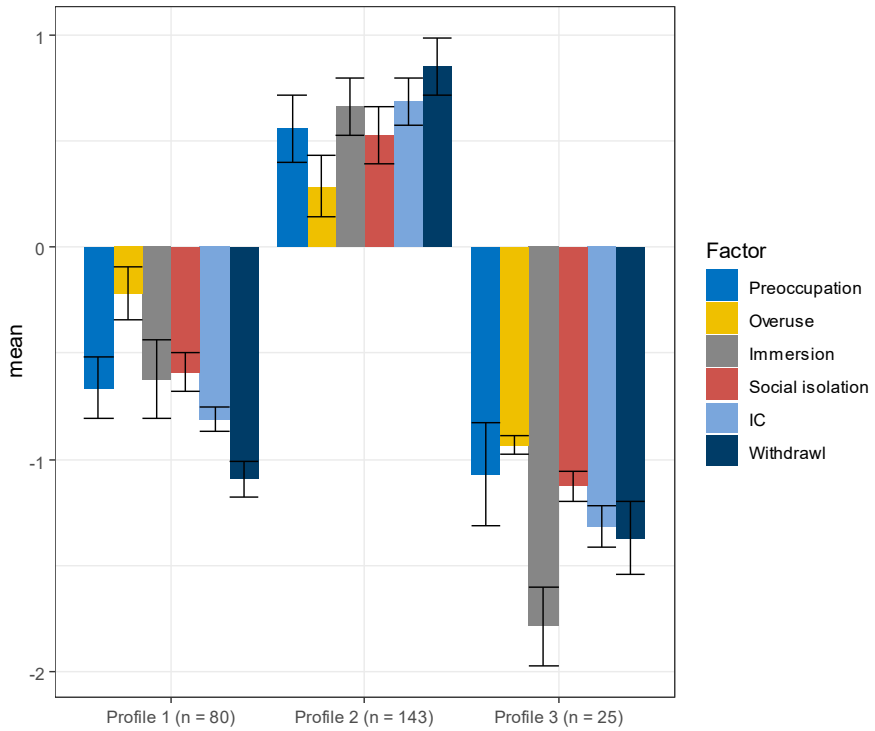

Figure 2. Latent Profile Analysis Results

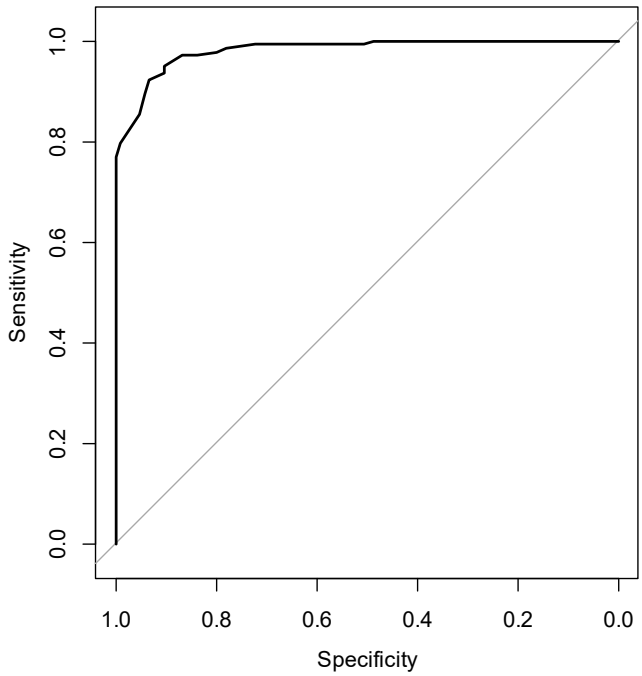

Figure 3. Receiver Operating Curve To Identify Above Average Risk Of Problematic Gaming (AUC = 0.9815)

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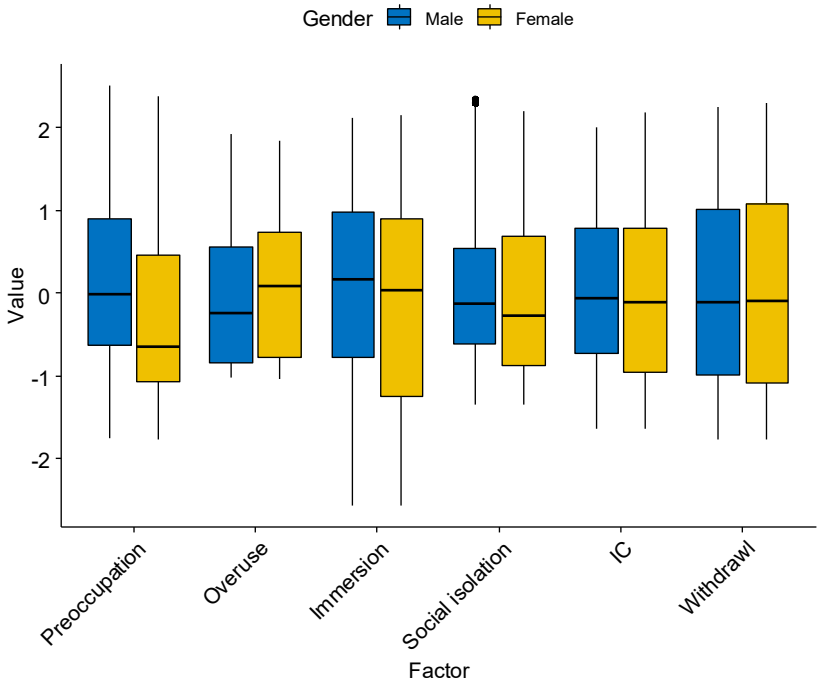

Figure 4. POGQ Dimensions Across Males And Females.

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Table 1. Pathological Online Gaming Addiction Scales:

Scale	Authors	Year	Criteria
Diagnostic and Statistical Manual (DSM)	The American Psychiatric Association	2000	Used for classifying mental disorders (substance dependence, pathological gambling). Identifies six components of addiction: silence, mood modification, tolerance, withdrawal symptoms, conflict and relapse.
Pathological Video Gaming Scale (PVGS)	Gentile	2009	10-item scale based on the DSM criteria.
Game Addiction scale (GAS)	Lemmens, Valkenburg, and Peter	2009	Seven-item scale (salience, tolerance, mood modification, relapse, withdrawal, conflict, and problems)
Internet Addiction Scale (IAS)	Kimberly Young	1996	20-item scale that measures mild, moderate and severe level of Internet Addiction.
Internet Gaming Disorder (IGDS-SF9)	Hally M. Pontes, Mark D. Griffiths	2014	A nine-item scale developed from the IGD, purposed to facilitate and unify research in the field of online gaming disorders.
Problematic Online Gaming Questionnaire (POGQ)	Zsolt Demetrovics, Robert Urban, Katalin Nagygyorgy, Judit Farkas, Mark D. Griffiths, Orsolya Papay, Gyongyi Koko nyei1, Katalin Felvinczi1, and Attila Olah	2012	26-item questionnaire created based on previous literature and gamer opinions. The 26 questions serve to identify and assess problematic online gaming.

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Table 2. Threshold To Identify Good Model Fit.

Measure	Threshold
X^2/df (C min/df)	< 3 good, < 5 acceptable
P close	> 0.05
The Tucker–Lewis index (TLI)	> 0.95 excellent, > 0.9 good
The Comparative Fit Index (CFI)	> 0.95 excellent, > 0.9 good
GFI	> 0.95
The standardized root mean square residual (SRMR)	< 0.08
The root mean square error of approximation (RMSEA)	< 0.05 good, 0.05 – 0.1 moderate

Table 3. Descriptive statistics for the study sample.

	n	248
Gender	Male (%)	158 (63.7)
	Female (%)	90 (36.3)
Age	10-13 (%)	118 (47.6)
	14-17 (%)	130 (52.4)
Nationality	Kuwaiti (%)	224 (90.3%)
	Non-Kuwaiti (%)	24 (9.7)
I live with	Father	3 (1.2)
	Mother	11 (4.4)
	Father and Mother	232 (93.5)
	Grandfather/Grandmother	2 (0.8)
Area	Al-Ahmadi	14 (5.6)
	Al-Asima	35 (14.1)
	Farwaniya	22 (8.9)
	Al-Jahra	6 (2.4)
	Hawali	106 (42.7)
	Mubarak Al-Kabeer	65 (26.2)
Average score	A	129 (52.0)
	B	84 (33.9)
	C	29 (11.7)
	D	6 (2.4)
Sleeping hours	8 hours	100 (40.3)
	> 8 hours	47 (19.0)
	< 8 hours	101 (40.7)

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Online gaming frequency	1-2 d/week	78 (31.5)
	3-4 d/week	60 (24.2)
	Almost everyday	62 (25.0)
	Everyday	48 (19.4)
Hours gaming/day	1-4 h	167 (67.6)
	5-9 h	59 (23.9)
	10-12 h	9 (3.6)
	> 12 h	12 (4.9)
Type/Genre of online games played the most	MMORPGs	29 (8.33)
	FPS	78 (21.67)
	RTS	10 (2.78)
	Simulations	12 (3.33)
	Adventure	35 (9.72)
	Puzzle	19 (5.28)
	Battle Royal	144 (40)
	Sports	32 (8.89)
Money spent per month on gaming	<10 KD	71 (28.6)
	>10 KD	36 (14.5)
	>20 KD	30 (12.1)
	None	105 (42.3)
	Else	6 (2.4)
KD: Kuwaiti Dinar		

Table 4. Reliability, Convergent And Discriminant Validity.

Factor	CR	AVE	1	2	3	4	5	6
1	0.8	0.667	0.817					
2	0.612	0.463	0.212	0.68				
3	0.78	0.429	0.58	0.381	0.654			
4	0.796	0.567	0.612	0.395	0.599	0.753		
5	0.674	0.511	0.7	0.472	0.708	0.786	0.714	
6	0.892	0.677	0.636	0.359	0.587	0.706	0.868	0.822

Table 4. Fit Indices For The Latent Profile Analysis Of The POGQ

Number of latent classes	AIC	BIC	SABIC	Entropy	BLR test statistic	P
2	2193.8	2387.06	2212.709	0.989	166.37	<0.001
3	2099.58	2391.2	2128.1	0.969	150.24	<0.001
4	2111	2501.23	2149.358	0.94	44.34	0.589

AIC: Akaike Information Criteria; BIC: Bayesian Information Criteria; SABIC: Sample size adjusted Bayesian Information Criteria.
BLR Test: bootstrapped likelihood ratio test; P: P-value associated with BLR Test.

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Table 5. Association Between Gender And POGQ Dimensions.

Dimension	Male (n = 158)	Female (n = 90)	P
Preoccupation	0.17 (1.05)	-0.30 (1.05)	0.001*
Overuse	-0.04 (0.83)	0.06 (0.86)	0.378
Immersion	0.07 (1.11)	-0.13 (1.25)	0.192
Social isolation	0.02 (0.87)	-0.04 (0.99)	0.64
IC	0.02 (0.92)	-0.03 (1.08)	0.711
Withdrawal	0.01 (1.16)	-0.02 (1.28)	0.838

Table 6. Correlation Between Academic Performance And POGQ Dimensions

Dimension	Spearman's rho	P
Preoccupation	-0.15	0.017
Overuse	-0.324	< 0.001
Immersion	-0.226	< 0.001
Social isolation	-0.22	< 0.001
IC	-0.231	< 0.001
Withdrawal	-0.178	0.004