

Effects of Excessive PUBG Gaming Hours on Educational Performance and Mental Health of University Students in Bangladesh: Evidence from SPSS and SmartPLS

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in partial fulfillment of the requirements for the degree of
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Declaration

It is hereby declared that

1. The thesis submitted is our own original work while completing degree at Brac University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. We have acknowledged all main sources of help.

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Abstract

PUBG is a famous game for the young generation among online video streaming game. PUBG gaming addiction has raised concern regarding academic performance and mental health. The aim of this research is to study the effects of PUBG gaming intensity on academic performance, mental health, sleep quality, social engagement. A questionnaire survey is conducted to collect data from 523 undergraduate students of both Public and Private universities of Bangladesh. For statistical analysis SPSS software is used and the SEM model is constructed through SmartPLS for analyzing relationships among variables. The findings show that excessive PUBG gaming highly impacts academic performance. The students who spend more time gaming suffer from stress anxiety, poor sleep quality and academic disruption. All these factors moderate the CGPA of the student. Moreover, PUBG players become gradually involved in gaming and interact with other players online which leads to social engagement in gaming circles. More gameplay finally results in less CGPA. This research highlights the interrelation among the constructs including gaming intensity, CGPA, stress and anxiety, sleep quality and social engagement from the software suggesting the importance of balanced gaming habits for academic and mental well being.

Keywords: PUBG gaming intensity, Academic disruption, CGPA, stress and anxiety, social engagement, sleep quality, SmartPLS, SPSS, Content Analysis.

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Chapter 1

Introduction

1.1 Introduction

The popularity of PUBG among students in Bangladesh has tremendously increased due to its world driven gameplay, high quality graphics and interactive features. While PUBG gaming can offer social contact, amusement and stress release, excessive online PUBG gaming has given rise to severe dangers. If excessive PUBG gaming is not monitored, it can create addictive behavioral patterns, decrease in academic rigor, and other psychological problems.

According to past study students' academic performance may decrease as a result of excessive PUBG gaming. Long gaming sessions frequently eat into the amount of time allotted for learning, attending lectures and completing assignments on time. Students may thus suffer from poor time management, less focus and inferior academic accomplishment. Additionally excessive PUBG gaming is usually related with harmful lifestyle choices like inconsistent sleep patterns and low physical activity. Research reveals that extended PUBG gaming is related with increased levels of stress, anxiety, and academic disruption. While some individuals use gaming as a tool to release stress and cope with obstacles, excessive gaming can result in emotional instability and poor overall life satisfaction. Games like PUBG feature highly competitive nature and intense stimuli and exposure to pressure situations in games can further alter the emotional regulation and behavioural responses of players.

Although the increasing body of research on gaming behavior suggests a link between excessive PUBG gaming, academic achievement and mental health, it remains tenuous and vague. Most of the available research is mainly focused on psychological effects or generic PUBG gaming addiction without considering cumulative effects on mental, social involvement and academic scores. Moreover, little research has been conducted in Bangladesh, where the social, cultural, and educational elements may have different impacts on PUBG gaming addiction.

Consequently, the aim of this study is to assess the effect of spending too much time on the PUBG game on the academic performance, social engagement and mental health of Bangladeshi University students. The goal of this research is to examine the relationship of intensity of playing video games with gaming disorder, academic achievement, and mental well-being through various statistical software

SPSS and Structural Equation Modeling (SEM) with the use of SmartPLS. It is believed that the current study's outcome will produce benefits/insights related to long PUBG gaming hours among the students. Further, it will help to formulate practical strategies that promote healthy digital choices.

1.2 Background

Online gaming among university students has become one of the most popular forms of entertainment these days. The involvement of young people in gaming has proliferated at a fast rate because of the rapid development of cellphones, high-speed internet and multiplayer online games. One of the most played online games, PlayerUnknown's Battlegrounds (PUBG) has millions of players worldwide including many university students in Bangladesh. Gaming is entertaining as it is a fun leisure activity and social contact but some fear the impact of school hours spent gaming on the mental and academic wellbeing of students.

Long time PUBG gaming can have an adverse impact on students' education, several studies show. Excessive online PUBG gaming may limit the time period that is available for academic activities like studying, attending classes and completing assignments. Due to this, students those who are playing video games for prolonged time may have difficulty concentrating, managing their time well and performing poorly academically. In addition, excessive PUBG gaming has been associated with bad lifestyle choices like poor sleep quality and irregular daily routines, which may further harm students' learning capacity and academic performance.

Too much PUBG gaming has been linked to many psychological and emotional disorders aside from academic issues. Research shows an association between excessive PUBG gaming and increased stress anxiety, depression and social withdrawal in children. Gaming serves as an outlet for stress relief in the present age, however, PUBG gaming too much can lead to addiction that disturbs mental health. This study focuses on Bangladeshi university students and investigates how excessive playing of PUBG for hours has impacted their academic performance and mental health.

Data were collected through survey and analysed through SEM (Structural Equation Modelling). A study using SmartPLS evaluating the relationship between PUBG gaming intensity, mental health disorders, sleep quality, social engagement and academic performance. SPSS also made use of for descriptive and inferential statistics. This gives a complete idea of how playing PUBG excessively impacts students' academic performance and mental health through these analytical techniques.

1.3 Research Gap

Earlier studies have explored the links between PUBG gaming activity and psychological well-being. However, there are still many gaps left in the literature. A number of studies do not attend to the academic performance of university students and rather focus on the negative impact PUBG gaming has on mental health like stress, anxiety and depression. Insufficient research exists regarding any direct effects of high levels of PUBG gaming on study habits, class participation and CGPA among Bangladeshi students. [21]

The lack of emphasis on particular online PUBG games in previous research is another drawback. Instead of focusing on the effects of a specific game, the majority of earlier research explores gaming addiction in a broad sense. However, compared to other game genres, distinctive features of PUBG such as competitive gameplay, extended gaming sessions and robust social interaction features may have a different effect on students behavior. Research that particularly examines the impact of PUBG gaming on university students is therefore necessary. [13]

Early studies utilized statistical approaches including ANOVA, t-test, and correlation method. This restricted their flexibility to exhibit complicated relationships between data. Stress levels, social interaction and sleep patterns may affect gaming behaviours in the same ways as psychological well-being and academic performance. Generally, these connections are not analysed sufficiently though.[12]

The present research seeks to address these limitations through an investigation into the combined effects of high gaming hours of PUBG on the educational performance and mental health of university pupils of Bangladesh. This study attempts a more demanding investigation of relationships among academic achievement, mental health and gaming activity using Structural Equation Modelling (SEM) using SmartPLS and statistical analysis using SPSS. This research helps us to know the effect of excessive online gaming on university students in Bangladesh.[23]

1.4 Motivation

PUBG Mobile has become a cultural phenomenon among Bangladesh university students because of the rapid rise of mobile and cheap internet data. Every campus residential hall or tea shop has students engaging in serious PUBG gaming with the gaming often extending till late night or morning. Despite anecdotal evidence and casual observation related to Bangladesh, there is a limitations on the prior research in the country's context. It suggests that excessive PUBG gaming is harmful to students' academic performance and mental health.

This gap is the motivation for this investigation. A scientific assessment of various reports from students who allegedly miss class or fail exams due to compulsive PUBG gaming that stem from anxiety and lack of sleep specifically most commonly finds no evidence of a causal link. Our research seeks to put some numerical weight behind the stories. Moreover, most research relevance is done in western or east asia which is vastly different from Bangladesh's family dynamics, educational needs and mental health infrastructure in Bangladesh. The current study, SmartPLS is used for advanced structural equation modeling and SPSS for statistical analyses to examine how hours spent on PUBG gaming can relate to academic performance, and mental health, and to identify the underlying mechanisms driving these relationships. The findings will allow students to become more self-aware while advising policymakers on the urgent need for digital health programs among the youth of Bangladesh. It will also help parents understand PUBG gaming addiction and university administrators to develop response programs.

1.5 Research Objectives

This paper intends to examine how prolonged playing of PUBG is affecting academic performance and mental health of the university students of Bangladesh. The aim is to assess whether the continuous playing of PUBG Mobile is significantly associated with poor academic performance which is measured in CGPA class attendance and study habits along with poor mental health measured in depression anxiety stress and sleep disturbance. The new study is using SmartPLS (advanced structural equation modeling) and SPSS (statistical analyses). Further, it examines how many hours are being spent on gaming.

1. **To Determine Demographic and Gaming Outline:** This research work aims to find out the demographic and gaming profile of the PUBG (Players Unknown Battlegrounds) players. Using a questionnaire, the academic performance of students who play the game is assessed. The study uses CGPA, time devoted to studying and concentration level as the assessment criteria. It uses CGPA, time spent studying, and concentration level as the assessment criteria for the study.
2. **Investigate Study-Performance Levels:** Students playing PUBG for long has been evaluated based on self-reported survey collected CGPA, study period and concentration in study.

3. **Investigate the Impact of Gaming Duration and Patterns:** Consider how prolonged PUBG gaming sessions and specific patterns (e.g. The late-night weekends and unstopped gaming sessions) affect students' academic performance and productive study time.
4. **Study the link between PUBG Gaming and Mental Health:** Examine the excessive playing of PUBG game on mental health and various mental health indicators like stress levels, anxiety symptoms, depression tendencies and sleep-related issues, among college students.
5. **Comparative Study of Students by Gaming Intensity:** This objective looks at and brings to light the significant difference in educational performance and mental health status subdivided into three groups by their intensity of playing PUBG: Battlegrounds excessive players, moderate players and non-players.
6. **Development and Validation of a Structural Equation Model:** Using SmartPLS, the study will develop and test a comprehensive Structural Equation Model (SEM) to show how excessive PUBG gaming time directly and indirectly affects the educational life and mental health results among students. An excessive gaming habit is an addiction.
7. **Practical evidence-based recommendation:** The goal of this initiative is to offer evidence-based recommendation to parents, students and academic and policy-making community, in order to check PUBG gaming patterns and mitigate the ill- effects of excessive gaming by students of Bangladesh Universities.

1.6 Research Methodology Overview

This study employs a quantitative research methodology in order to examine the effect of prolonged playing of PUBG games on the academic performance and mental health of Bangladeshi university students. By using the quantitative methodology, the author can provide accurate measurement that can enable one to allow a statistical analysis of the relationship of PUBG gaming habits, academic performance and mental health.

University undergraduates were chosen as respondents using questionnaire. One example of such questions was on a Likert scale to find the patterns of behaviour among students regarding the amount of time played on PUBG, indicators of socialization, academic engagement, psychological stress and emotional well-being. Students were provided with the questions online with anonymity and informed consent.

Students were the non-probability convenience sample of this study. The Statistical Package for the Social Sciences (SPSS) and Partial Least Squares Structural Equation Modeling (SmartPLS) equipped to conduct traditional and structure analysis were used in processing and analyzing the data.

- **SPSS:** Descriptive statistics and preliminary check through data analysis were done using SPSS. Through frequency distribution, measure of central tendency and standard deviation analysis of the profiles and gaming practices of the respondents was done. Besides, correlation, hypotheses testing, independent sample t test, one way and two way ANOVA were used as inferential statistics to study the relationship of PUBG gaming intensity with academic achievement and mental health indicators.
- **SmartPLS:** The SmartPLS software was used to perform PLS-SEM for a more profound investigation of complex interaction. The measurement model and structural model can be evaluated using this technique. Reliability and validity using measures AVE which is Average Variance Extracted, and Cronbach's Alpha Composite Reliability. Later, path analysis was used to compare the direct impact of the excessive gaming of PUBG on academic performance and psychological wellness.

Utilizing statistics from SPSS along with SmartPLS has offered a wider range of analysis to study merely the observed variable and unobserved hidden stimulants.

1.7 Contributions and Novelty

The research purpose is to discuss the effects of excessive PUBG gaming on mental health, academic performance (CGPA), sleep quality, social engagement and stress and anxiety. Furthermore, this approach helps to fill the gap of the prior studies on the same topics but uses methods other than those calculated methods and procedures in SPSS and SmartPLS to determine the relationships between the three variables.

- The study employs SEM (Smart PLS) application in the Structural Equation Model to analyze latent constructs and complex relationships between variables. Further, this provides more accurate results that have been ignored in many previous PUBG gaming studies.
- The study suggests taking into consideration the variables in research not reflected as often in prior research that impact the outcome of the study, such as sleep patterns, stress levels and connectedness.
- The data collection design of the survey aims to capture the effect of environmental factors, opinion of the PUBG players and PUBG gaming related stress and anxiety using GAD7.
- The study builds multi-level analyses whereby the SPSS software is used to test the confirmatory hypothesis, while application of SmartPLS is used to see the relationship of these variables.

This study highlights the universal effects of PUBG gaming on academic and psychological consequences through a more moderated set of measures that has been tested through the control group thereby bridging the gap in past studies.

Chapter 2

Background and Related Works

2.1 Background

Under this multiple approach, the study analyzes the impact of adverse excessive playing of PUBG on academic performance and mental health of the students of Bangladesh. Through the integration of modern modelling with existing statistics, the purpose of this is to provide a comprehensive and credible analysis of the factors associated with addictive PUBG gaming behaviour.

2.1.1 Two-Step Statistical Analysis Using SPSS and Smart-PLS

This study examines the excessive hours of playing PUBG game, their impact on academic performance and mental health using two stages of analysis on SPSS and SmartPLS.

The objectives of study are to prepare several hypotheses, which will test the effect of PUBG gaming hours on the dependent variables, academic factors such as CGPA and study habits and mental factors such as stress, anxiety, undergraduate year, gender, study disruption and general well-being. Statistical tests such as ANOVA and independent sample t-tests assist in assessing differences and associations among variables.

With SmartPLS structural equation modeling (SEM) is conducted for a more sophisticated analysis. The variables identified by SPSS are further analysed in order to look for association among latent constructs like PUBG gaming intensity, psychological well-being and academic performance. By utilizing this approach, we can investigate both direct and indirect effects, thus gaining more insight into the structure of the data.

The incorporation of these two phases provides a flexible and robust validation approach for the proposed research model. Although the analysis with SPSS helps identify parameters, analysis with SmartPLS gives more insights on how these parameters function with each other and affect one another.

2.1.2 Research Approach

Researchers used exploratory and confirmatory research in the current study. However, it aims to examine the effect of excessive hours spent in gaming PUBG.

The exploratory study is done mainly to examine the relations when earlier knowledge is limited or variables are not well defined. The exploratory phase of this study aims to detect patterns and relationships between gaming behaviour and psychological as well as academic characteristics. SmartPLS is a suitable software for exploratory research involving several constructs with complex interrelationships. SmartPLS can help study these relationships using Structural Equation Modelling (SEM) even though the relationship between PUBG gaming intensity, stress anxiety and academic performance are not well established in the previous literature.

Confirmatory research tests specific hypotheses that are developed based on prior studies and current theories. The SPSS in this stage is used for carrying out statistical analyses of structured data and defined variables. To the proposed hypothesis on the impact of excessive PUBG gaming on academic results and mental health outcomes, independent sample t-test, ANOVA and correlation analysis techniques are applied. Through this step, findings would be of statistical significance and would also be backed by evidence.

2.1.3 SPSS- Statistical Package for the Social Sciences

The SPSS, in this research is a statistical tool. The goal of this article is to find out the effect of excessive playing of PUBG on academic performance and mental health of university students of Bangladesh specifically through group comparisons by t-tests and ANOVA.

(i) ANOVA Test: An ANOVA enables researchers to ascertain whether there are significant differences among multiple group means while accounting for Type I error, whereas a t-test is restricted to two groups.[8]

The formula for one-way ANOVA is:

$$F = \frac{MS_{\text{between}}}{MS_{\text{within}}} = \frac{\frac{\sum_{k=1}^k n_k (\bar{X}_k - \bar{X})^2}{k-1}}{\frac{\sum_{i=1}^n (X_{ik} - \bar{X}_k)^2}{n-k}}$$

where:

MS_{between} = Mean Square Between Groups

MS_{within} = Mean Square Within Groups

n = Total number of Students

k = Number of gaming groups (3 groups)

n_k = Number of students in (n) group (k)

$\bar{X}_k$ = Mean of group k

$\bar{X}$ = Overall mean

X_{ik} = Individual score of student (i) from group (k)

(ii) T-tests: In the study, the independent samples t-test is used to compare academic performance (CGPA) with psychological wellness indicators (emotional discomfort, anxiety, and mood disorder levels):

- PUBG players between male and female.
- Comparison between Students who play PUBG extensively and those who play not at all or only occasionally.

The formula of independent t-test:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

where:

$\bar{X}_1, \bar{X}_2$ = mean academic performance or mental health scores of group 1 and group 2

s_1^2, s_2^2 = variances of the two groups

n_1, n_2 = sample sizes of the two groups

2.1.4 SmartPLS (Partial Least Squares Structural Equation Modeling)

A statistical tool called SmartPLS is used to research complicated relationships between variables that might not be successfully examined using more conventional statistical methods like t-tests or ANOVA.

(i) Measurement Model: The measurement items validity and reliability are the primary subjects of this evaluation. For this purpose two commonly used indicators

are Composite Reliability and Average Variance Extracted.[9] Composite Reliability evaluates the internal consistency of the indicators associated with a latent construct while Average Variance Extracted evaluates how much variance the construct captures in relation to measurement error.

The formulas used for calculating these metrics are CR and AVE:

$$\text{Composite Reliability (CR)} = \frac{(\sum_{i=1}^n \lambda_i)^2}{(\sum_{i=1}^n \lambda_i)^2 + \sum_{i=1}^n \epsilon_i}$$

$$\text{Average Variance Extracted (AVE)} = \frac{\sum_{i=1}^n \lambda_i^2}{\sum_{i=1}^n \lambda_i^2 + \sum_{i=1}^n \epsilon_i}$$

where:

λ_i = the factor loading of the i^{th} item

ϵ_i = the error variance associated with the i^{th} indicator

n = indicates the number of indicators used to measure the construct

These metrics help determine whether the measurement items reliably capture the intended latent variables.

(ii) Structural Model: Researchers can learn how one construct affects another by using path coefficients to estimate both direct and indirect effects.[8] Bootstrapping techniques which produce repeated samples to test the stability and significance of the estimated paths are used to assess the statistical significance of these relationships.

The structural model can be represented by the following equations:

$$\begin{aligned}\eta_1 &= \beta_{11}\xi_1 + \beta_{12}\xi_2 + \epsilon_1 \\ \eta_2 &= \beta_{21}\xi_1 + \beta_{22}\xi_2 + \epsilon_2\end{aligned}$$

where:

η_j = represents an endogenous latent variable

ξ_i = represents an exogenous latent variable

β_{ij} = denotes the path coefficient from ξ_i to η_j

ϵ_j = represents the error term associated with the endogenous variable η_j

2.2 Related Works

A prevalence rate of 32.6 percent for PIU was found indicating a significant percentage of students who use the internet excessively. Strong correlations between PIU and psychiatric comorbidities, specifically depression, anxiety and stress, were also found in the study indicating that excessive internet use may serve as a coping strategy for underlying psychological problems. Long periods of time spent online and frequent internet use were also found to be significant predictors of PIU. These findings show how closely student behavioral patterns and mental health outcomes are related. In light of the current study, excessive PUBG gaming can be considered a specific form of problematic internet use that may result in comparable psychological anguish and academic challenges. Therefore, this study investigate the effects of excessive PUBG gaming hours on academic performance and mental health among Bangladeshi university students.[16]

Among college students internet addiction has become a major psychological and social issue especially in developing nations like Bangladesh. A substantial percentage of 475 undergraduate students from various Bangladeshi universities showed moderate to severe levels of the internet addiction. The results showed that excessive internet use is linked to a number of detrimental effects such as anxiety, insomnia, subpar academic performance and emotional instability. The study also found statistically significant variations in psychological distress and internet addiction according to demographic variables like residential status, year of study and gender. Significantly many students reported experiencing severe psychological depression and distress. Considering that too much gaming of PUBG can be seen as a particular form of internet overuse. Subsequently, this study is an extension of earlier research, focusing on PUBG gaming behaviour analysis and its impact on academic performance and mental health problems of Bangladeshi students applying SPSS and SmartPLS.[9]

Development countries like Bangladesh are now becoming more often victims of internet addicted psychology among students. According to a study of 475 undergraduate students of different Bangladeshi universities, a substantial number of them were addicted to the internet ranging from moderate to severe levels. Further, the study showed a strong link between addiction to the internet and psychological distress and depression. The findings revealed that if a person is glued to the internet, he may suffer from anxiety, insomnia, poor academic performance and mood swings. The study further analysis statistically differences in Internet addiction and psychological distress across the demographic variables, such as residence, year of study and gender. A significant number of students indicated experiencing serious psychological distress and depression due to excessive internet use . Excessive playing of the game PUBG may be considered as a kind of internet use, so these results are relevant to our present study. In this context, the current study builds on prior studies by examining PUBG gaming behaviour. It also looks at the impact of PUBG gaming behaviour on the academic performance and psychology of university students in Bangladesh using SPSS and SmartPLS in the current study.[15]

A quantitative study with a sample size of 325 students, who were confined using standardized questionnaires, found frequent players of PUBG, a huge number play the game for more than eight hours per day, to be suffering from moderate to high stress levels. This includes mental tiredness, unstable emotions, sleeping disturbances, and more. Besides, it was highlighted in the research several academic bad outcomes like drop in academic performance, loss of concentration, late submission of assignments, and class absences. Moreover, resorting to online communication on top of decreasing in-person contact was seen as another weakening of ties. PUBG usage significantly influences students' academic outcomes, social life and psychological well being; time spent playing was found to be the main predictor, according to analysis of ANOVA and regression (Zeeshan and Khalid 2023). As stated above, the usage of SPSS Software and SmartPLS in a particular research project allows analysing the impact of high PUBG playing hours on academic performance and mental health of university students.[21]

Problematic Internet Use (PIU) has become increasingly important for Bangladeshi university students because of the strong association with lifestyle factors and mental health. A cross-sectional study done in Bangladesh on 404 university students showed that about 44% had symptoms of PIU. So, this suggests PIU is quite common among students. Furthermore, researchers found that gender dissimilarities, emotional factors like relationship breakdowns, and non-educational internet use patterns significantly predicted PIU. Interestingly, a strong type of connection has been discovered between excessive chatting in streaming video rooms and gaming online, as well as PIU. Moreover, the results indicated that PIU is significantly correlated with depressive symptoms, as excessive internet usage may hamper students' mental health and general well-being, according to Hossain et al. (2020). The findings as to the harm of excessive gaming, can be classified as a particular type of a non-educational use of the internet.[5]

Growing usage of social media (Instagram, Facebook, and other social platforms) among college students has been associated with a negative lifestyle. Using validated

instruments like the Pittsburgh Sleep Quality Index and Young's Internet Addiction Test, the study established that a high level of PIU was associated with a lesser likelihood for students to have adequate quality of sleep. Moreover, the results of multivariate analysis suggested that PIU is a significant predictor of irregular sleep patterns after controlling lifestyle and sociodemographic characteristics. As per the findings, using the Internet excessively affects the sleep cycle and causes academic and emotional as well as cognitive impairment (Islam et al. 2020). Playing PUBG excessively might be a distinct type of internet abuse that may lead to psychological stress and sleep problems.[20]

PIU has been revealed to be significantly adverse to the health and well being of Bangladeshi students, especially in terms of sleep quality. Even after adjusting for sociodemographic and lifestyle factors the analysis showed that PIU was still a powerful predictor of poor sleep quality. These results imply that excessive internet use can interfere with sleep which may then affect students' academic performance, emotional stability and cognitive abilities (Islam et al. in 2020). Excessive PUBG gaming can be viewed in the context of this study as a type of problematic internet use.[3]

The destination of this cross section study was to illustrate extensiveness of video game disorder among juvenile students specifically undergraduate students and identify the relative predictors and asses the effect on their mental health. The approach that has been taken in this study is that 2364 students were taken who were egyptian undergrads and were from Menoufia University. Data collected through closed-ended questions by online has been used .The questions included socio demographic data,gaming activity (using the Internet Gaming Disorder-20 (IGD-20) questionnaire), and mental health (using the Mental Health-5 (MH-5) questionnaire)(Raouf,2022). This study discovered a video game disorder (VGD)prevalence of 18.91%.The prime predictors of VGD included gender being male,living in city or town,longer gaming duration,shorter sleep duration and higher body mass index.On the contrary inferior socioeconomic status was a protective factor.A strong negative correlation had bExcessive online gaming has been found to have a major impact on Bangladeshi university students academic performance. According to a study with 399 students 62. 7 percent of them played online games for more than 30 hours a week suggesting that gaming addiction is very common. Long-term gaming is linked to lower CGPA, less study time, less physical activity and higher absenteeism from class according to the findings. Furthermore, gaming addiction levels were found to be influenced by behavioral and demographic factors like age, gender and internet access with male students being more likely to play video games excessively. These results imply that prolonged gaming sessions may have a detrimental effect on students' general lifestyle and academic performance . According to the current study excessive PUBG gaming is one type of such behavior that calls for additional research using SPSS and SmartPLS to examine its effects on mental health and academic performance.[14]

The detrimental effects of online gaming on academic performance have made it a growing concern in Bangladesh. A nationwide study involving 502 participants between the ages of 6 and 17 revealed a significant negative correlation between aca-

ademic achievement and gaming addiction meaning that students with lower levels of online gaming addiction did better academically. The study also found demographic trends showing that male students and those in the 13–17 age range had higher rates of addiction. The study verified that excessive gaming has a substantial impact on students' social behavior and academic performance using statistical methods like logistic regression and chi-square tests. Despite the fact that this study focuses on school-aged children its conclusions are extremely pertinent to the current investigation because university students may continue to exhibit similar patterns of excessive gaming behavior. In this regard extended PUBG gaming may be linked to poorer academic achievement and possible mental health issues necessitating additional research with SPSS and SmartPLS.[10]

Particularly during the COVID-19 pandemic when people turned more to online activities to deal with stress and negative emotions, problematic internet use (PIU) has become more common among young people in Bangladesh. Excessive internet use was found to be significantly correlated with a number of lifestyle and behavioral factors such as decreased physical activity, increased participation in online gaming social media use and other recreational internet activities according to a large-scale cross-sectional study with 13525 participants. University students are particularly susceptible to such behaviors as the study also showed that younger people and those with higher levels of education were more susceptible to PIU. Online gaming and other digital activities were found to be significant predictors of problematic internet use by hierarchical regression analysis (Islam et al. in 2020. Since excessive PUBG gaming can be seen as a particular type of such online behavior these findings are especially pertinent to the current study. Thus by investigating how extended PUBG gaming hours affect academic performance and mental health among Bangladeshi university students using SPSS and SmartPLS this study expands on previous research.[19]

In Ahmed et al. s cross-sectional study. (2024) found a significant correlation between increased musculoskeletal pain and mobile game addiction in 840 Bangladeshi university and college students (mean age 21 years). According to the Gaming Addiction Scale 24.4 percent of participants had moderate to severe addiction and 52.1 percent reported pain in at least one body region. Males were more likely than females to be addicted (OR 2.0195 percent CI 1.14–3.53 $p=0.016$) and those who were addicted were two to three times more likely to experience neck pain (OR 2.84 95 percent CI 1.49–5.36 $p=0.016$) upper back pain (OR 3.75 95 percent CI 1.97–7.12 $p=0.001$) elbows (OR 3.3895 percent CI 1.34–8.50 $p=0.010$) and wrists/hands (OR 2.1495 percent CI 1.00–4.57 $p=0.049$). The study emphasizes mobile gaming addiction as a significant risk factor for musculoskeletal discomfort among students in developing contexts like Bangladesh using the Nordic Musculoskeletal Questionnaire and binary logistic regression however its cross-sectional design restricts causal conclusions and self-reports introduce potential bias.[11]

Islam Co. (2022) presented a study at an IEEE conference that suggested a machine learning-based framework to predict online gaming addiction among Bangladeshi youth. Aware of the increasing risks to the nation's health and wellbeing posed by video game addiction the researchers examined earlier research and found common

risk factors (e. g. g. . Lemmens Gaming Addiction Scale was used to categorize participants and gather primary data from both addicted and non-addicted people. After preprocessing, to predict Addiction, we have used 9-classifiers (K-Nearest Neighbors (KNN), Logistic Regression (LR), Support Vector Machine (SVM), Gaussian Naive Bayes (GNB), Random Forest (RF), AdaBoost, Decision Tree (DT), XGBoost and Gradient Boosting (GB)). Of all of them, AdaBoost has the highest accuracy which is at 93.00 percent in respect to addiction. Although specifics regarding dataset size feature selection and validation metrics are still lacking in the abstract this work shows the potential of machine learning for early identification of gaming addiction in developing contexts like Bangladesh building on established scales and highlighting factors associated with addiction risk.[6]

Kabir and others. (2023) used stratified random sampling and an online questionnaire to survey participants from 12 universities (6 public and 6 private) in a mixed-methods cross-sectional study on mobile phone addiction among Bangladeshi university students. While mobile phones offer advantages like social connectivity communication, entertainment business support and access to education (e. g. The g. online resources and flexible learning) the study discovered that addiction primarily results in negative outcomes such as poor academic performance, career setbacks and physical health problems (e. g. The g. deterioration of mental health (e. g. stress or inactivity). g. . emotional distress). Concerns regarding the future productivity and well-being of this group were raised by the negative impact on the majority of students. The authors emphasize the growing global seriousness of mobile addiction and its danger to Bangladesh's youth urging a greater understanding of its complex effects.[7]

The Hossain group. (2025) released a multidimensional dataset in Scientific Data that is publicly accessible and captures academic correlates and gaming behavior among university students in Bangladesh. The data was gathered through a questionnaire between March and April of 2023. Demographics, academic achievement, gaming habits (frequency duration preferences) , emotional reactions, exhaustion, wellbeing and health factors like wearing glasses are all included in the dataset. It fills in gaps in previous datasets by providing richer culturally relevant data appropriate for AI-driven analysis. It was created for the Global South and is in line with WHO gaming health guidelines (without clinical IGD diagnosis). citing relevant validations of the IGD scale (e. g. . The open-access resource (via Zenodo) encourages balanced habits among Bangladeshi youth in low-resource settings by supporting exploratory research on gaming’s effects on education social dynamics and health (IGDS9-SF PIE-9) and prevalence studies.[1]

Using purposive and snowball sampling the PUBG Addiction Test and the Emotional Intelligence Scale a cross-sectional study of 104 Indian college students (mean age 21. 7 years 83. 65 percent male) investigated the relationship between PUBG addiction and emotional intelligence. A significant negative correlation ($r = -0.223$ $p < 0.05$) and a negative predictive effect of PUBG addiction on emotional intelligence were found using Pearson correlation and simple linear regression accounting for 5% of the variance ($p < 0.05$). This is consistent with earlier research that links increased gaming addiction to decreased emotional intelligence, diminished self-control and changed emotional experiences especially during online gaming spikes like the COVID-19 pandemic in India. According to the findings emotional intelligence training should be incorporated to assist students in controlling their emotions when playing video games excessively.[18]

Kwok Co. (2021) investigated the effects of internet gaming and social media use on physical activity sleep quality quality of life (QoL) and academic performance in a preliminary 3-month longitudinal study with 15 Hong Kong university students (mean age 26. 87 years). Self-report questionnaires, academic transcripts application screen-time logs for social media and gaming and objective actigraphy data for sleep and physical activity were all provided by the participants. The findings indicated that while more social media use was negatively connected with both physical activity and sleep quality ($r_s = 0.48$ to 0.63) more internet gaming time was negatively correlated with psychological QoL and physical activity ($r_s = 0.49$ to 0.62). Furthermore, increased physical activity was positively correlated with psychological quality of life ($r_s = 0.49$) internet gaming and smartphone addiction were negatively correlated with academic performance ($r_s = 0.51$ to 0.53). These results provide preliminary evidence to direct focused interventions for excessive screen-based behaviors by indicating that problematic internet gaming and excessive social media use may negatively impact several health and performance domains in college students.[13]

Biegun and others. (2021) found that higher problem video gaming scores were positively correlated with longer daily gaming time, greater social alienation and stronger online gaming motives (competition escape coping recreation and socializing) when the Problem Video Game Playing Test (PVGTT) was validated in a sample

of Canadian university students. In contrast to the gateway hypothesis problem video gaming did not significantly correlate with problem gambling or its common mental health correlates (stress anxiety and depression) indicating significant differences between these two behavioral patterns among young adults.[17]

Yao Co. (2015) compared 32 matched healthy controls to 34 college students with Internet gaming disorder (IGD) to examine inhibitory control and decision-making processes. Individuals with IGD demonstrated significant inhibition deficits in response to gaming cues using a gaming-related Go/No-Go task. They also showed impaired decision-making particularly when faced with risk (but not ambiguity). Greater impairments in risky decision-making were positively correlated with higher error rates on No-Go trials (indicating poorer gaming-specific inhibition) among individuals with IGD. These results offer insights into the cognitive mechanisms of IGD and possible intervention targets by suggesting that cue-specific inhibitory impairments may be connected to decision-making deficits under risk in IGD.[8]

In a sizable random sample of 2984 university students Ohayon and Roberts (2021) investigated the prevalence and comorbidities of DSM-5 Internet Gaming Disorder (IGD). In S. Undergraduate and graduate university students were interviewed over the phone in 2007 and 2015. The study discovered a 5.3 percent prevalence (one in 20 students) of IGD which is defined as 15 hours per week of recreational electronic device use plus 5 addiction-related symptoms. Suicidal thoughts were significantly more common in those with IGD (16.9 percent vs 6.6 percent) suicide attempts (9.7 percent vs 3.3 percent) major depression (9.7 percent vs. 3.0 percent) and social anxiety disorder (24.8 percent vs 8.5%). Non-restorative sleep, excessive fatigue, fewer close friends, depressed mood bipolar disorder, social anxiety disorder and poor to fair health status were all independently predicted by IGD according to multivariate analyses. These results demonstrate the high prevalence of IGD in student populations and its links to sleep disorders, mental illnesses and impaired functioning that may have an impact on academic achievement. In order to investigate the directional association between Internet Gaming Disorder (IGD) and psychological well-being, conducted a three-wave longitudinal study with 1,054 first-year university students (aged 17–21 years, 41.2% male). Although lower psychosocial well-being did not predict increases in IGD, cross-lagged panel models indicated that higher levels of IGD at earlier phases negatively affected subsequent self-esteem, perceived social support, and life satisfaction. These unidirectional effects support the interpersonal impairment hypothesis, suggesting that IGD functions as a maladaptive behavior that contributes to, rather than results from, diminished psychosocial functioning. Additionally, it was found that IGD was consistently negatively associated with social support and self-esteem across all waves, with stronger associations among men than women. The findings reinforce the validity of classifying IGD as a mental health condition and underscore its role as a risk factor for impaired psychosocial well-being during the transition from late adolescence to emerging adulthood.[2]

Alrashed and others. (2022) used the IGDS9-SF GAD-7 PHQ-9 and PSQI to study the relationships between gaming disorder (GD) anxiety depression and sleep quality in a sample of 457 first-year undergraduate students. Compared to male students, female students reported substantially higher levels of anxiety and depres-

sion. Gaming disorder was positively correlated with depression anxiety and poor sleep quality anxiety and depression were moderately correlated with poorer sleep quality. Students studying health sciences had poorer sleep quality than students in other academic fields. According to regression analysis anxiety sleep quality, gaming painkiller use and gender accounted for 64% of the variation in depression. According to mediation analyses anxiety directly mediated the relationship between sleep quality and depression while gaming disorder was found to be indirectly mediated by sleep quality. These results support the need for focused mental health screening and support programs for first-year students by highlighting the interrelated roles of gaming disorder mental health symptoms and sleep disturbances during the high-risk transition to college.[4]

Among college students Internet Gaming Disorder (IGD) has been linked to a number of psychological disorders. Among 221 university students in Italy, a study found a high prevalence of IGD risk. Specifically, 14.9% of participants met the clinical criterion for diagnosis. The study results indicated a significant positive association between IGD and dissociative experiences (depersonalization, derealization, and imaginative engagement). It appears that gaming might be linked to pathological psychological states and diminished emotional stability. The research also observed a difference in the prevalence of gaming-related addiction in male and female students. According to De Pasquale et al. (2018), this finding suggests that too much online gaming may produce psychological effects that go beyond normal stress and anxiety. Over-gaming of PUBG may also cause mental health illness of Bangladeshi university students. The importance of the use of SPSS and SmartPLS may have assessed the impact of PUBG gaming on university students. Impact of PUBG on the academic performance of the university student in Bangladesh.[12]

IGD or Internet Gaming problem is recognized as a recent behavioral disease among college level students having significant functional and psychological consequences. A major study of 7022 first-year college students in Mexico found that 2% of students were male, while only 0.8% were female. According to the study, the role functioning or help-seeking (more psychiatric or medical) of these students were impaired. Thus, these students were considered to have an Injury Gaming Disorder. Moreover, the results provided evidence for the DSM-5 diagnostic criteria for gaming disorder in different populations. All in all, the findings indicate that excessive gaming is also considered problematic behaviour and may be a risk factor for psychological distress and functional impairment. Considering this, the present study proposes that excessive playing of PUBG may be associated with mental health and academic problems among Bangladeshi university students. A similar study can be undertaken with the aid of SPSS and SmartPLS.[22]

Concerns about video game addiction among university students have escalated, particularly with the COVID-19 pandemic with extended periods of confinement and increasing gaming activity. According to a study that was conducted among Spanish university students, during the pandemic, gaming behaviour increased remarkably significantly in 16.6% of the sample. According to the findings of the study, gender with male being predominant and excessive use of social media were significant predictors of gaming addiction. Another finding of the study is comorbidity which shows the gaming addiction is often linked with mental/psychological issues. The results of statistical analyses, including logistic regression, show that excessive gaming behaviour may result from more than one interrelated factor and may adversely affect academic life and mental health. This study is relevant for the current research as excessive gaming of PUBG by Bangladeshi students may impact their studies and create psychological distress like depression and anxiety. The impacts of using SPSS and SmartPLS are checked.[23]

Chapter 3

Methodology

3.1 Dataset Description

An online survey was conducted containing 34 questions. The dataset includes the responses of 523 students from Bangladeshi public and private universities. Around 77.1% of the respondents are male students, while 22.9% of the students are female.

Survey Questionnaire

Section 1: Undergraduate Student's PUBG Gaming Habits and Mental Health Survey

1. **University Type:** (Public / Private)
2. **Gender:** (Male / Female)
3. **Age:** (18-20, 21-23, 24-26, 27 and above)
4. **Undergraduate year:** (1st year, 2nd year, 3rd year, 4th year)
5. **Do you play PUBG?** (Yes / No)

Section 2: Gaming Habits and Academic Performance

6. **How many days per week PUBG is played:** (1-2 days, 3-4 days, 5-6 days, Every day)
7. **Average daily time spent on PUBG:** (Less than 1 hour, 1-2 hours, 3-4 hours, 5+ hours)
8. **How many hours do you play PUBG on weekends?** (Less than 2 hours, 2-4 hours, 5-6 hours, More than 6 hours)
9. **For how many years have you been playing PUBG?** (Less than 1 year, 1-2 years, 3-4 years, More than 4 years)
10. **I often play PUBG late at night.** (Strongly Disagree to Strongly Agree)
11. **I skip study time to play PUBG.** (Strongly Disagree to Strongly Agree)

12. **I play PUBG to escape from academic pressure.** (Strongly Disagree to Strongly Agree)
13. **My PUBG gaming affects my study time negatively.** (Scale 1: Strongly Agree to 5: Strongly Disagree)
14. **I submit assignments late because of PUBG.** (Scale 1: Strongly Agree to 5: Strongly Disagree)
15. **I feel my CGPA has decreased because of PUBG gaming.** (Scale 1: Strongly Agree to 5: Strongly Disagree)
16. **Your CGPA:** (Below 2.5, 2.5-3.0, 3.1-3.5, Above 3.5)

Section 3: Anxiety Level Social Connection

17. **I feel nervous or anxious when I cannot play PUBG.** (Not at all, Several days, More than half the days, Nearly every day)
18. **I find it difficult to control worrying about PUBG or gaming-related matters.** (Not at all, Several days, More than half the days, Nearly every day)
19. **I worry too much about PUBG gaming (such as ranking, matches, or performance).** (Not at all, Several days, More than half the days, Nearly every day)
20. **I find it hard to relax because I keep thinking about PUBG or gaming.** (Not at all, Several days, More than half the days, Nearly every day)
21. **I feel restless or unable to stay still when I am not playing PUBG.** (Not at all, Several days, More than half the days, Nearly every day)
22. **I become easily irritated or annoyed because of PUBG gaming or interruptions while playing.** (Not at all, Several days, More than half the days, Nearly every day)
23. **I feel afraid that something bad might happen in the game, such as losing a match or performing poorly.** (Not at all, Several days, More than half the days, Nearly every day)
24. **How would you describe your level of social interaction while playing PUBG?** (Very low, Low, Moderate, High)
25. **Do you consider playing PUBG as a way to avoid dealing with your personal problems?** (Not at all, Slightly, Moderately, Strongly)
26. **Do you neglect your responsibilities in order to play PUBG?** (Never, Rarely, Sometimes, Often)
27. **Has playing PUBG negatively affected your relationships with friends or family?** (Never, Rarely, Sometimes, Often)

Section 4: Feeling Check-In and Personal Satisfaction

28. **I feel anxious because of my PUBG addiction.** (Scale 1: Strongly Disagree to 5: Strongly Agree)
29. **How much trouble do you have while sleeping because you are worried about your PUBG gaming?** (Scale 1: Strongly Disagree to 5: Strongly Agree)
30. **I become easily irritated because of my PUBG addiction.** (Scale 1: Strongly Disagree to 5: Strongly Agree)
31. **My muscles feel tense because I worry about my PUBG addiction.** (Scale 1: Strongly Disagree to 5: Strongly Agree)
32. **I feel tired or unwell because I worry about my PUBG gaming situation.** (Scale 1: Strongly Disagree to 5: Strongly Agree)
33. **How often have you felt the following in the past few days?** (Grid: Rarely, Occasionally, Sometimes, Frequently, Very Often)
- Afraid
 - Distressed
 - Nervous
 - Scared
 - Upset
34. **What's your opinion about PUBG gaming?** (Long answer text)

3.2 Outlier Removal

Certain observations in any statistical dataset may show abnormally high or low values because they differ significantly from the rest of the group which are known as outliers. The procedure entails figuring out the Third quartile (Q3) and the first quartile (Q1):

$$IQR = Q_3 - Q_1$$

Using a 1.5 multiplier, a "normal range" is created based on this. An outlier is identified as if any data point that falls outside of the following ranges:

$$\text{Lower Bound} = Q_1 - 1.5 \times IQR$$

$$\text{Upper Bound} = Q_3 + 1.5 \times IQR$$

By removing these extreme data points, the final statistical model improves the accuracy of the SPSS and SmartPLS analysis results by more precisely representing the actual behavioral patterns of Bangladeshi undergraduate students.

3.2.1 Data Normalization and Encoding

Label encoding and ordinal encoding are applied for data normalization. For categorical data such as gender, University type(public/private), ordinal encoding is applied. For gender normalization, male is encoded to 1, and female is encoded to 2. On the contrary, the variable that represents scale or order, ordinal encoding is applied. Some scaled data need to be encoded like: 0 means low, 1 means medium, 3 means medium high, and 4 means high.

Label Encoding: In the dataset, university type, gender, and play pubg is encoded by label encoding. Here, university type(private=1, public=2), gender(male=1, female=2), play_PUBG(no=0, yes=1)

Ordinal Encoding: CGPA, daily_hours, years, and other variables are encoded relying on their ordinal values. For example, felt_upset encoded 0 to 5 meaning rarely=0, occasionally=1, sometimes=2, frequently=3 and very often=4

3.3 Scale Standardization

The comparisons were made simpler by using a standard score index (SSI) to normalize the score to a 100-point system. The raw scores were transformed into a scale where 0 percent is the lowest and 100 percent is the highest. Other classifications included low (0–20 percent), moderate (20–40 percent), and moderate (40–60 percent). 80–100 percent is considered high, whereas 60–80 percent is considered moderately high.

3.4 SSI- The Standardized Score Index

The Standardized Score Index (SSI) is a statistical method that puts data on the same scale for fair comparison. The dataset includes scales 0 to 3 for CGPA and 0 to 4 for skip_study_time. CGPA is normalized using the Standardized Score Index (SSI). SSI uses the following formula to convert a student's CGPA into a 100-point scale:

$$SSI = 100 \times \frac{\text{max_score} - \text{min_score}}{\text{sum_score} - \text{min_score}}$$

3.5 Methodology Diagram

The researchers conducted an online survey on PUBG players about PUBG gaming intensity, academic disruption, social engagement, stress anxiety, sleep quality, and CGPA. Outlier removal, data encoding, and normalization were applied to the raw data for preprocessing. For data analysis, a dual software approach is followed, one is SPSS, and the other is SmartPLS. The study conducted 1-way ANOVA, 2-way ANOVA, and independent sample T-tests using SPSS software.

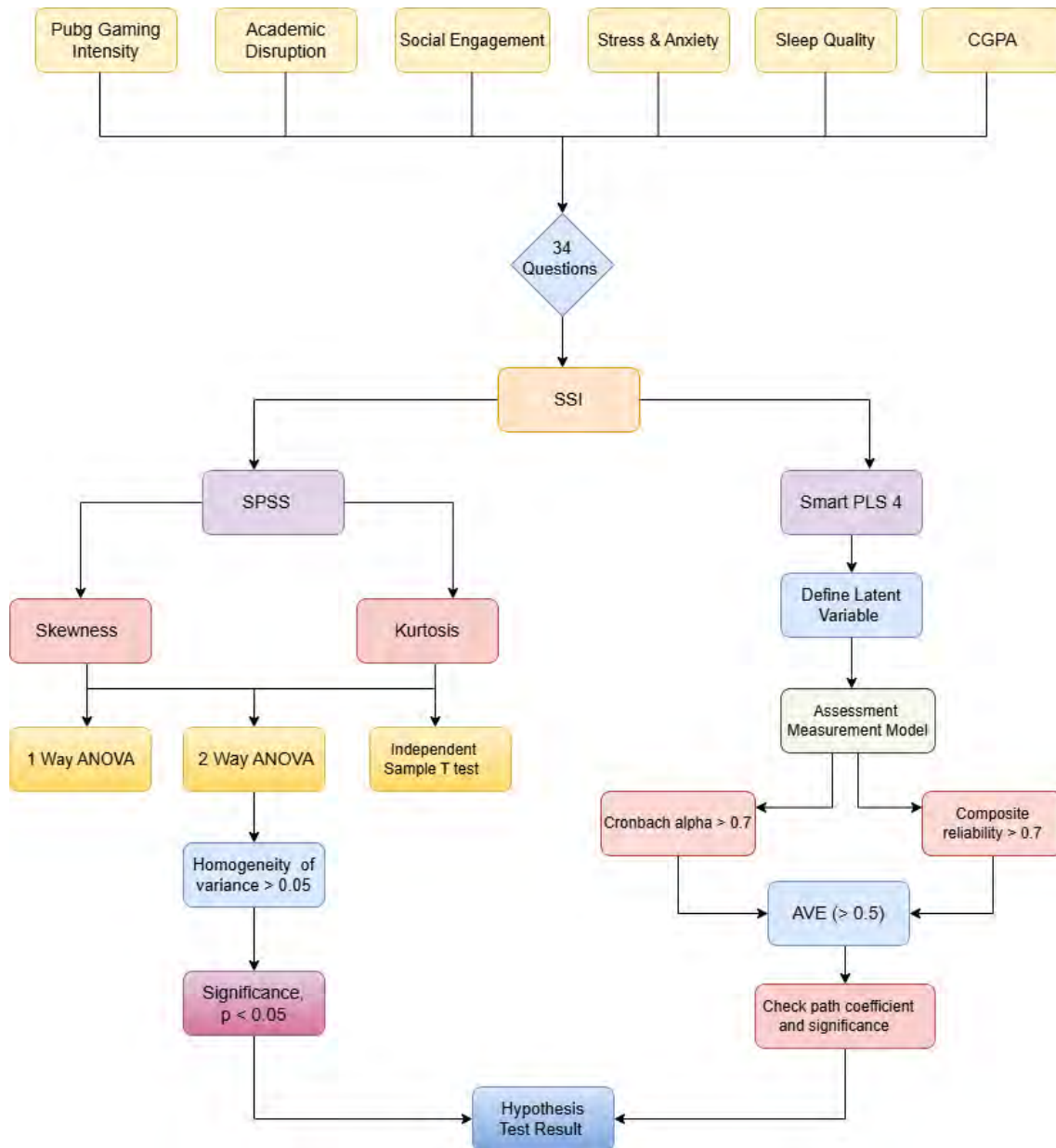


Figure 3.1: Workflow of the model

These tests significantly identify the relationship between different groups. Another statistical analysis technique is deployed to build SEM models using SmartPLS. PLS-SEM algorithm output describes the complex relationship between observed variables and latent constructs. It validates the measurement model's reliability and tests structural hypotheses.

Chapter 4

Statistical Analysis

4.1 SPSS Analysis

In this study, we employed two widely recognized SPSS techniques, Kurtosis and Skewness, to validate our dataset:

- **Kurtosis:** This measure evaluates how "peaked" or "tailed" a distribution is compared to a normal distribution. The kurtosis values which range between -2 to +2 show that the variable possesses the features of a normal distribution.
- **Skewness:** Refers to a measure of the asymmetry of a distribution, determining whether a distribution is symmetric or skewed. The skewness values in our study also range from -2 to +2 and depict that the data complies with proper statistical testing requirements.

This confidence in the reliability of data used in the study provides strong support for the statistical methods applied to examine the impact of gaming addiction on CGPA and the mental health of Bangladeshi undergraduate students.

4.1.1 One-way ANOVA Test

We applied the one-way ANOVA test to perform the proposed hypothesis.

Hypothesis 1

- **Null Hypothesis (H_0):** There is no variation in the analysis of average daily time spent on PUBG/CGPA between participants with financial limitations to buy academic resources.
- **Alternate Hypothesis (H_1):** There is a variation in the analysis of average daily time spent on PUBG/CGPA due to the participant's financial limitations to buy academic resources.

Table 4.1: ANOVA Results for Average Daily Time Spent on PUBG Gaming/CGPA

Source	Levene Statistic	F	df1	df2	Sig. (Homogeneity of variance)	Sum of Squares	Mean Square	Sig. (ANOVA)
Average daily time spent on PUBG gaming/CGPA	71.874	17.937	3	491	.000	404.598	13.321	0.000
Based on Median	40.146		3	491	.000			
Based on Trimmed Mean	73.708		3	491	.000			

Result Description: This one-way ANOVA hypothesis test results show there's a significant change in CGPA, considering the average daily time spent on PUBG gaming. Here, the null hypothesis has been rejected because our ANOVA test result, $F = 17.937$, and $\text{Sig.} = 0.000$, which demonstrates that daily PUBG gaming hour affects students' academic grades. Our Levene's test for homogeneity of variances is significance. $= 0.000$ indicates variances among the groups are not the same that does not follow the assumption of homogeneity of variances. Rather, this significant ANOVA test shows an important impact on relationships.

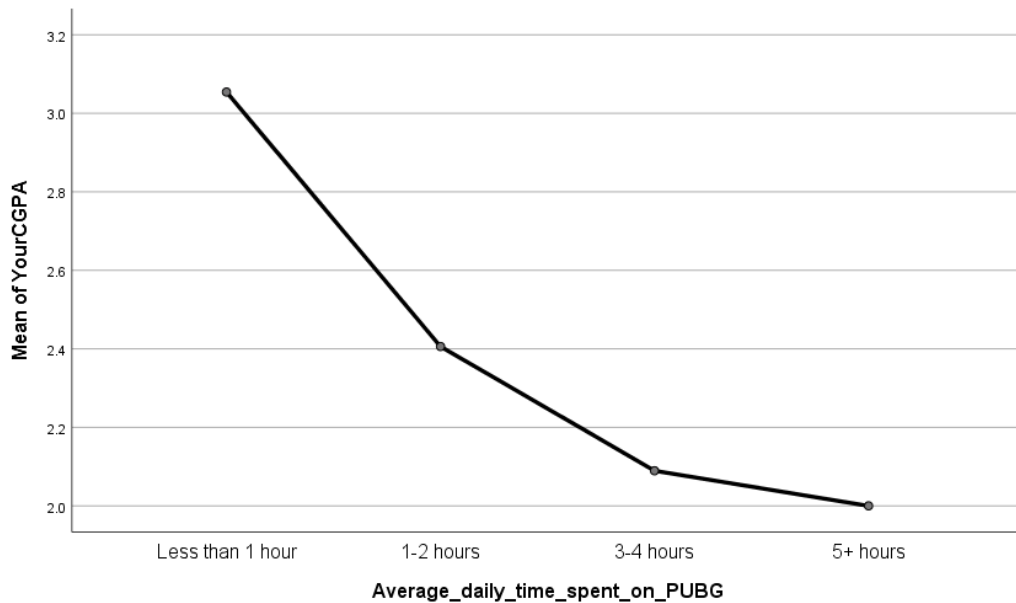


Figure 4.1: Effect of average PUBG gaming time on academic CGPA.

Graph Description: The graph displays the relationship between students' academic CGPA and their average daily time spent on PUBG gaming. The mean CGPA is displayed on the y-axis, and students' gaming hour gets higher as it moves on the right side of the x-axis. As it is seen that PUBG gaming hours increase from less than 1 hour to 5+ hours, students' CGPA gradually drops. Students who pass their hours by playing PUBG games most likely face a significant fall in their CGPA, averaging close to 2.0. On the contrary, students who spend less time in PUBG gaming attain maximum CGPA in their academic life.

Hypothesis 2

- **Null Hypothesis (H_0):** Nervous level during PUBG gaming sessions has no significant effect on CGPA.
- **Alternate Hypothesis (H_1):** There is a variance in nervous levels during PUBG gaming sessions that significantly affects CGPA.

Table 4.2: ANOVA Results for Nervous Level During PUBG Gaming Sessions/CGPA

Source	Levene Statistic	F	df1	df2	Sig. (Homogeneity of variance)	Sum of Squares	Mean Square	Sig. (ANOVA)
Nervous level during PUBG gaming session/CGPA	16.605	81.206	3	491	.000	404.598	44.725	.000
Based on Median	7.172		3	491	.000			
Based on Trimmed Mean	17.5887		3	491	.000			

Result Description: This one-way ANOVA hypothesis test results show there's a significant change in CGPA considering their nervous level while they can not play the PUBG game. In the ANOVA test result, we got Sig. = 0.000, which accepts the alternate hypothesis and eventually rejects the null hypothesis as the value is less than .0005. It means it is highly significant. The idea of equal variances among groups is violated as the Levens Statistic result Sig.= 0.000. This indicates fluctuation in nervous level is not the same over their CGPA. More research or post-hoc tests would be essential to figure out the group variations.

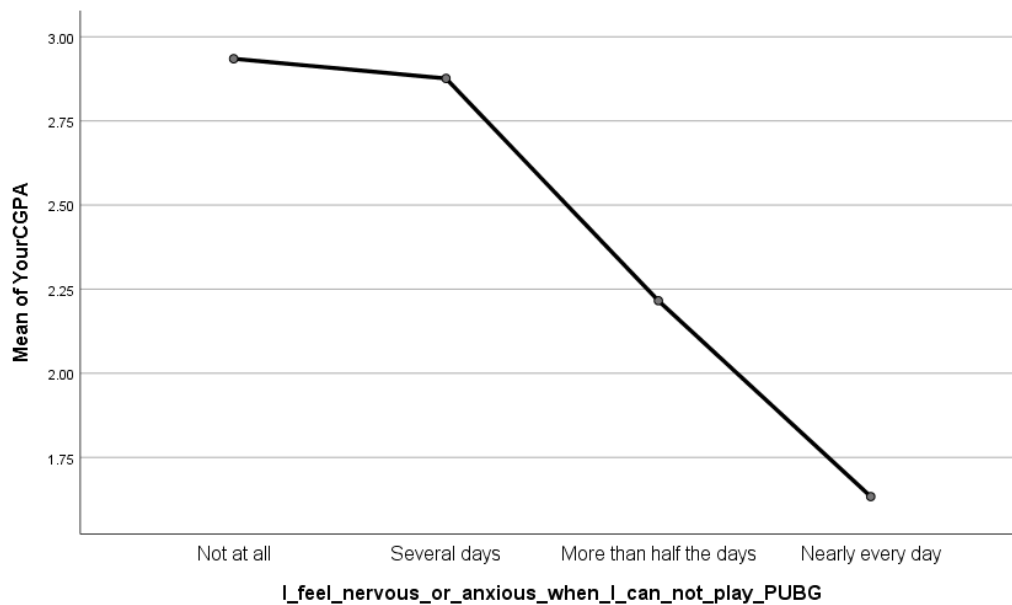


Figure 4.2: Effect of Nervous Level for unable to play on Academic CGPA.

Graph Description: The graph displays the correlation between nervous level while they can not play PUBG and their CGPA. The x-axis represents the nervous level, and the y-axis represents their CGPA. We can see the x-axis shows a rise in students' nervous level when they can not play PUBG, from the option not at all to nearly every day, whereas the y-axis shows their academic CGPA increased. From the above plot, students, when they can not play PUBG, their nervous level is at "nearly every day", their CGPA stays between 2.75 - 3.00, which suggests their CGPA gradually decreases in academic performance.

4.1.2 Two-way ANOVA Test

The two-way ANOVA test was run to assess the interaction between various factors, evaluating the following hypotheses:

Hypothesis 1

- **Null Hypothesis (H_0):** There has been no significant change between undergraduate years, PUBG gaming hours, and CGPA among students.
- **Alternate Hypothesis (H_1):** There has been a significant change between undergraduate years, PUBG gaming hours, and CGPA among students.

Source	F	Sig.
Levene's Test		
Based on Mean		0.000
Based on Median		0.000
Between-Subjects Effects		
Undergraduate Year	6.043	0.000
Average daily time spent on PUBG	5.411	0.001
Undergraduate Year * Average daily time spent on PUBG	9.224	0.000

Table 4.3: ANOVA Results: Effects of Undergraduate Year and Daily Time spent on PUBG

Result Description: From the above table, students' undergraduate years value $F = 6.043$ and $p = 0.000$ shows a significant difference to accept alternate hypotheses and reject the null hypothesis. This demonstrates that a student's undergraduate year has a significant effect on students CGPA. Likewise, their average daily time spent on PUBG gaming ($F = 5.411$, $p = 0.001$) gives a significant change, which ensures that this factor considerably affects their academic grades. Yet the interaction between students' undergraduate year and time spent on PUBG gaming, where $F = 9.224$ and $p = 0.000$, is not significant because it has no combined effect on their academic CGPA, so we can say our null hypothesis is somewhat rejected because undergraduate year and time spent on PUBG gaming have independently significant changes.

Hypothesis 2

- **Null Hypothesis (H_0):** There has been no significant change between feeling nervous, feeling difficult to control due to worry about PUBG gaming, and CGPA among students.
- **Alternate Hypothesis (H_1):** There has been a significant change in feeling nervous and felt difficult to control worrying about PUBG gaming and CGPA among students.

Source	F	Sig.
Levene's Test		
Based on Mean		0.000
Based on Median		0.000
Between-Subjects Effects		
Felt nervous	37.779	0.000
Felt difficult to control worrying about PUBG	2.199	0.004
Felt nervous * Felt difficult to control worrying about PUBG	2.185	0.070

Table 4.4: ANOVA Results: Effects of feeling nervous and find difficult to control worrying about PUBG gaming

Result Description: From the above table, $p = 0.000$, so the null hypothesis is rejected. Feeling nervous, where $F = 37.779$, $p = 0.000$, and finding it difficult to control due to worry about PUBG gaming, where $F = 2.199$, $P = 0.004$, significantly influences the result. Furthermore, both combined interactions where $F = 2.185$, $p = 0.070$ have greatly significant combined outcomes, which indicates that both factors boost the overall effect.

4.1.3 Independent Sample T-test

The independent sample t-test was utilized to compare the means between gender groups, assessing the following hypotheses:

Hypothesis 1

- **Null Hypothesis (H_0):** There has been no significant change between the two gender groups (male and female) and their CGPA among students.
- **Alternate Hypothesis (H_1):** There has been a significant change between two gender groups (male and female) and their CGPA among students.

Source	N	Mean	Std. Deviation	Mean Difference	t	df	Sig. (2-tailed)	95% CI (Lower-Upper)
Gender 1 (Male)	391	2.19	0.930	-0.017	-0.172	493	0.004	-0.214 0.179
Gender 2 (Female)	104	2.21	0.809	0.17	-0.186	-	0.002	-0.199 0.165

Table 4.5: Independent sample T-test results comparing Gender 1 and Gender 2

Result Description: The result shows that both genders (Male =1, Female = 2), Sig. 2-tailed = 0.004 and Sig. 2-tailed = 0.002, respectively. The “p” value is smaller than 0.005, so it has highly significant changes in their academic CGPA between both genders. The mean CGPA of male students was $M = 2.19$, $SD = 0.930$ and the mean CGPA of female students was $F = 2.21$, $SD = 0.809$ which is a bit higher than male students that depicts females spending less time in PUBG games which is why their CGPA is higher.

Hypothesis 2

- **Null Hypothesis (H_0):** There has been no significant change between the two skipping Study Time for PUBG groups and their CGPA among students.
- **Alternate Hypothesis (H_1):** There has been a significant change between the two skipping Study Time for PUBG groups and their CGPA among students.

Source	N	Mean	Std. Deviation	Mean Difference	t	df	Sig. (2-tailed)	95% CI (Lower - Upper)
Study_Time for_PUBG_1 (No_Skip)	144	2.58	0.548	0.543	6.301	493	0.000	0.374 0.713
Study_Time for_PUBG_2 (Skip)	351	2.04	0.973	0.543	7.8557	446.617	0.000	0.407 0.679

Table 4.6: T-test results for the Effect of Skipping Study Time to Play PUBG on Students' CGPA.

Result Description: The table of the results shows students who skip their study time for playing PUBG, and those who do not skip are two groups, and their effect on CGPA. Those who skip their study times have a mean of 2.04, and does not skip have a mean = 2.58, with p value = 0.000. This represents students who skip their study for playing pubg; their CGPA eventually decreases.

4.2 SmartPLS Analysis

4.2.1 Assessment for Convergent Validity

To test for convergent validity in the model, all indicators for each latent variable (LV) should have significant standardized factor loadings, which ideally 0.70. A 0.70 or higher value of factor loadings describes at least 50% of the indicator's variance. Most of the indicators represent higher values than the threshold. Calculated the Average Variance Extracted (AVE) for each latent variable. The threshold value for AVE is 0.50 or higher. It measures the ratio of the actual latent variable to measurement error. In addition, the Composite Reliability (CR) determines internal consistency, which should be 0.70. Significant loadings, an AVE of at least 0.50, and a CR of 0.70 or higher all show that the indicators converge to accurately represent the intended construct.

4.2.2 Testing for Discriminant Validity

The Heterotrait-Monotrait (HTMT) and Fornell-Lacker criterion were used to assess discriminant validity. When comparing correlations with other constructs, the Fornell-Lacker criterion suggests that the square root of AVE for each should be higher. The criteria are met for all constructs in the model. The constructs differ in that their HTMT ratios are less than 0.85, while the proposed HTMT threshold is 0.85. If the HTMT value is above the threshold, the concept would have discriminant validity. However, all values were below the threshold.

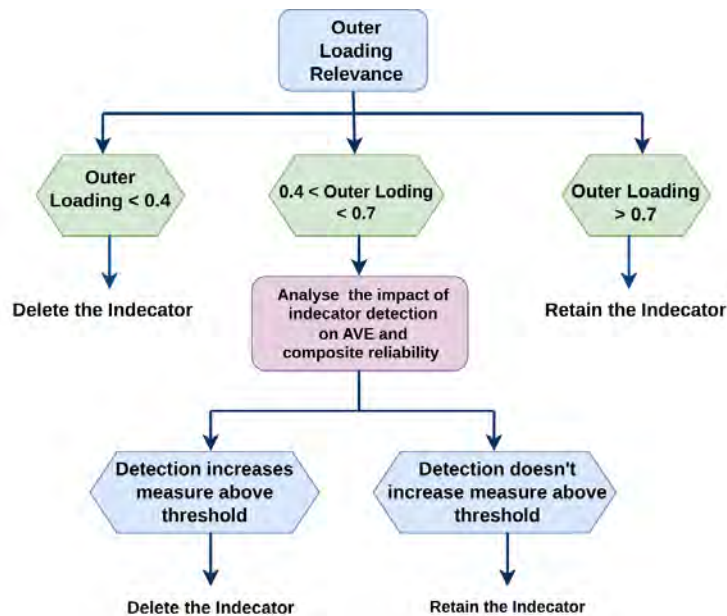


Figure 4.3: Convergent & Discriminant validity testing algorithm

4.2.3 Structural Equation Modeling (SEM)

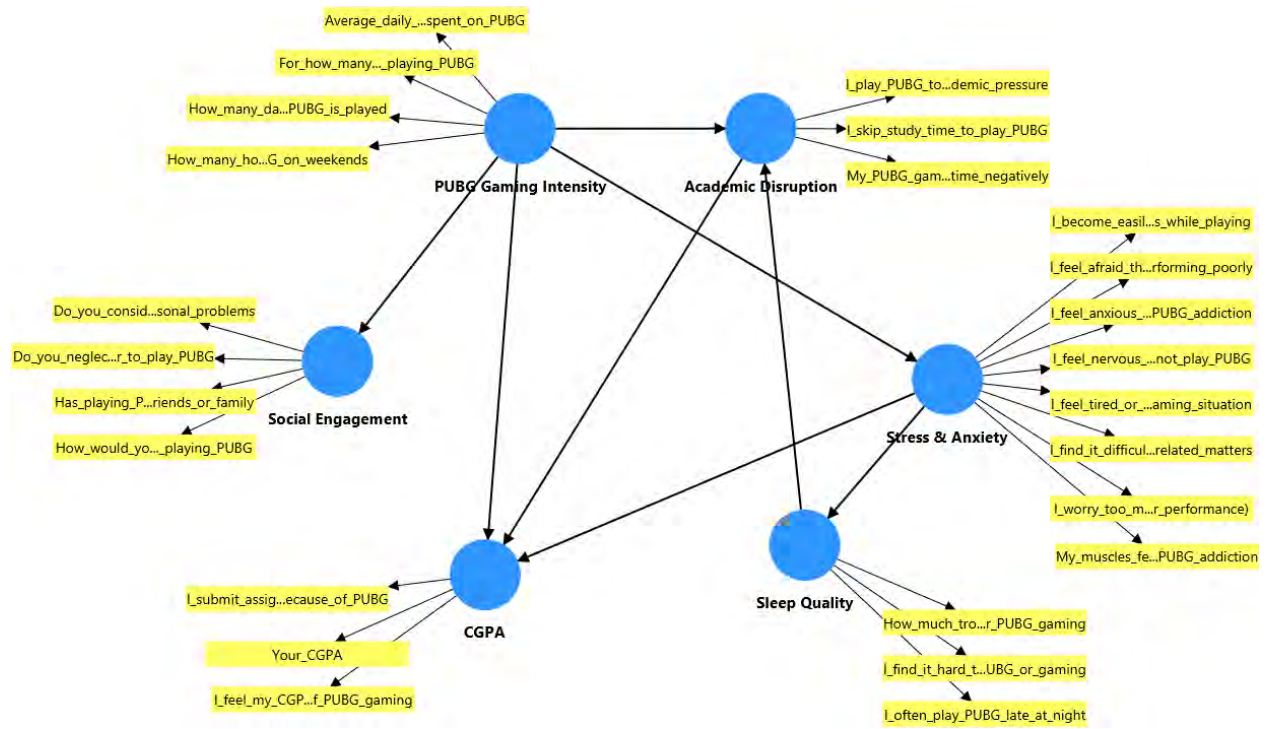


Figure 4.4: Latent Variable Measurement Model

Latent Variables	Items	Mean	SD	Loadings	Cronbach's Alpha	Composite reliability rho_a	Composite reliability rho_c	Average variance extracted (AVE)
PUBG Gaming Intensity	PGI1	3.029	1.203	0.893	0.847	0.911	0.899	0.698
	PGI2	2.803	1.103	0.879				
	PGI3	3.084	1.073	0.958				
	PGI4	2.771	0.999	0.718				
Academic Disruption	AD1	3.822	1.223	0.951	0.807	0.846	0.703	0.656
	AD2	3.728	1.294	0.968				
	AD3	1.795	1.061	0.708				
Stress and Anxiety	SA1	2.799	1.097	0.871	0.951	0.957	0.959	0.720
	SA2	2.809	1.211	0.797				
	SA3	3.673	1.351	0.851				
	SA4	2.828	1.170	0.872				
	SA5	3.532	1.277	0.869				
	SA6	2.516	1.096	0.874				
	SA7	2.975	1.143	0.727				
	SA8	3.442	1.250	0.881				
Sleep Quality	SQ1	4.061	1.344	0.935	0.887	0.889	0.930	0.816
	SQ2	2.698	1.288	0.866				
	SQ3	4.096	1.326	0.908				
CGPA	CGPA1	1.839	1.066	0.941	0.864	0.933	0.916	0.785
	CGPA2	2.080	1.009	0.793				
	CGPA3	1.572	0.905	0.918				
Social Engagement	SE1	2.983	1.054	0.903	0.764	0.921	0.826	0.635
	SE2	2.914	1.145	0.935				
	SE3	2.987	1.084	0.914				
	SE4	2.071	1.044	-0.125				

Table 4.7: Summary of key indicators and Reliability and Validity Metrics for Latent Variables

Variable	Academic Disruption	CGPA	PUBG Gaming Intensity	Sleep Quality	Social Engagement	Stress & Anxiety
Academic Disruption	0.810					
CGPA	-0.277	0.887				
PUBG Gaming Intensity	0.859	-0.084	0.899			
Sleep Quality	0.885	-0.135	0.898	0.935		
Social Engagement	0.921	-0.210	0.894	0.930	0.950	
Stress & Anxiety	0.900	-0.124	0.835	0.933	0.935	0.959

Table 4.8: Fornell–Larcker criterion

Variable	Academic Disruption	CGPA	PUBG Gaming Intensity	Sleep Quality	Social Engagement	Stress & Anxiety
Academic Disruption						
CGPA	0.603					
PUBG Gaming Intensity	0.829	0.259				
Sleep Quality	0.805	0.218	0.849			
Social Engagement	0.836	0.512	0.799	0.745		
Stress & Anxiety	0.841	0.226	0.896	0.711	0.637	

Table 4.9: Heterotrait-monotrait Ratio (HTMT).

4.2.4 Correlation Matrix

A correlation matrix is a measurement technique that tells the bivariate relationships among constructs. The matrix gives a primary check for multicollinearity. Furthermore, a positive correlation means that if one variable increases, the other one also increases. On the contrary, Reverse relationship is denoted by negative correlation. The correlation coefficient range is -1 to 1, which describes how strongly the variables are connected. Here value 0 means no relation between variables. However, p-values measure the statistical significance of observed patterns.

Summary of Correlations

- **PUBG Gaming Intensity:** PUBG gaming intensity is highly positively correlated with academic disruption, which is 0.859. This high value indicates that students addicted to PUBG gaming face higher academic disruption. Additionally, PUBG gaming intensity is highly negatively correlated with CGPA(-0.084). It depicts that the students who spent more time on PUBG gaming have a lower CGPA. The construct is also highly correlated with sleep quality, which is 0.898.
- **Academic Disruption:** Academic disruption is highly positively correlated with stress and anxiety(0.900) and social engagement(0.921) but negatively correlated with CGPA, which is -0.277. It describes that students who neglect academic tasks tend to be involved in game-related social circles. They eventually suffer from stress and anxiety, which leads them lower academic performance.
- **Stress & Anxiety:** Stress and anxiety represent a strong positive correlation with sleep quality(0.933) and academic disruption(0.900), besides being negatively correlated with CGPA (-0.124). This result defines students' poor sleep quality due to stress and anxiety, which are associated with academic results.
- **Sleep Quality:** Sleep quality positively correlated with academic disruption(0.885) and Stress Anxiety (0.933) but negatively correlated with CGPA(-0.135). Poor sleep quality leads to poor concentration in study. Thus negatively affects academic results as well.

- **Social Engagement:** Social engagement is positively correlated with sleep quality (0.930) and academic disruption (0.921), but describes a negative correlation with CGPA (-0.210). In the study, high social involvement in a gaming community results in a poor sleeping schedule and higher academic detachment. All these factors eventually pull down students' academic performance.
- **CGPA:** CGPA negatively correlated with PUBG gaming intensity(-0.084). The students who spend less time in gaming usually achieve good grades. Moreover, CGPA negatively correlated with stress and anxiety(-0.124), sleep quality(-0.135), and academic disruption(-0.277). These results indicate that the students who have PUBG addiction can't sleep well and suffer from stress and anxiety. All of these together result in less academic success.

4.3 Qualitative Results: Content Analysis of User Opinions

The research collected open-ended questions from PUBG players. For analyzing the opinion, a conceptual content analysis is applied. The data is categorized into five dimensions: Academic Impact, Entertainment, Emotional State, Social Interaction, and Behavioral Dependency.

Concept Category	Key Identifiers in Text	Frequency (f)	Percentage(%)
Academic Performance	decreased CGPA, hamper studies, focus away	8	44.4%
Psychological Stress	mentally devastated, frustrating, unstable, stress	7	38.9%
Behavioral Addiction	cannot live without, highly addicted, addiction	5	27.8%
Recreational/Relaxation	entertainment only, relaxation, feel happy, fun	9	50.0%
Social Dynamics	good friends, social interaction, trolling, pro player	4	22.2%

Table 4.10: Content analysis of qualitative responses from PUBG players.

The analysis of PUBG's effects on the undergraduate experience reveals a two-way division within the experiences of those who play the game. 50.0% of the undergraduate students categorized a means of entertainment. However, 44.4% of the respondents indicated that their gaming activities were negatively affecting their academic success as reflected in their CGPA. Furthermore, 38.9% of the students expressed negative emotions while playing PUBG.

Additionally, another category of analysis revealed that 27.8% of the survey responses indicated compulsive use of the game, as demonstrated by the language used to describe their addictive relationship with PUBG. Furthermore, 22.2% of those survey respondents cited the social benefits of the game and its communities forming friendships. These qualitative analyses help to further explain the quantitative analyses regarding the stress and relaxation feelings of the student population playing PUBG together.

Chapter 5

Findings

5.1 Experimental Setup

The cleaned primary dataset was subjected to a systematic statistical analysis using IBM SPSS Statistics and SmartPLS 4 software as part of the experimental design. The conventional inferential statistical test and partial least squares structural equation modeling (Smart-PLS SEM) have been utilized in this two-folded approach to check the effects of excessive PUBG gaming on academic performance and mental health of Bangladeshi university students.

5.1.1 Software Installation

This research was conducted through two software: **SPSS** and **SmartPLS**.

- **SPSS:** Statistical Package for the Social Sciences refers to the SPSS. Furthermore, ANOVA and independent sample t-tests were utilized. The installation procedure is as follows:
 - Download the newest SPSS from IBM.
 - Follow the installation steps according to your OS which may be Windows or Mac.
 - Ensure all required libraries are available to optimize functionality
- **SmartPLS:** The structural equation modeling using smartPLS (Partial Least Squares Structural Equation Modeling). To assess underlying variables and analyse the relationship between academics. It carried out structured equation modelling (SEM) between CGPA and mental health using Smart-PLS.
 - To download the software, visit the official SmartPLS website and install it.
 - Later on, the installation is done as directed by the operating system.

5.1.2 Registration and Licensing

- **The License for IBMSS:**
 - IBM SPSS Statistics will require a valid license key following installation. A license was obtained by means of an individual subscription.

- After entering the license key into the IBM License Authorization Wizard, the software was successfully activated and prepared for examination.

- **The License for SmartPLS:**

- SmartPLS offers a full version that requires a membership in addition to a free version with limited functionality. For this investigation, the complete version was used.
- The software must be registered after downloading. When the program was first released, all of its features could be accessed by entering the license key that was given at the time of purchase.

5.1.3 Dataset Integration

An anonymous online survey yielded 400 valid responses for this study's data collection. Likert-scale questions concerning the connection between excessive PUBG gaming hours, academic CGPA, and behavioral health effects among Bangladeshi university students were used in the study.

- **Preprocessing of Survey Data:**

- A Google Form was used to deliver the data in CSV format for the online survey method.
- The dataset had been prepared to eliminate false or incomplete responses before integration with SPSS and SmartPLS.

- **Enter data into SPSS:**

- The Open Data feature in SPSS was used to import the updated dataset. Variables were appropriately defined after the CSV file was chosen.
- Likert scale results have been converted into numerical values for analysis, in addition to other data transformations.

- **Import Data into SmartPLS:**

- To try to simulate the structural equations, the data collection was entered into SmartPLS. Following their import and mapping into the software interface, the variables were connected to related latent constructs like academic CGPA, mental stress, and mental health.
- To demonstrate the relationships between the data model and the investigated hypotheses, paths were put into place.

Using a structured system to prepare and collate datasets resulted in the smooth integration of raw survey data with both analytical platforms. Consequently, inferential statistical analyses as well as partial least squares structural equation modelling (PLS-SEM) were executed successfully by IBM SPSS Statistics and SmartPLS 4. This permitted analysing the hypotheses which argue that excessive hours of playing the PUBG game affect the academic CGPA of Bangladeshi university students as well as their mental health.

5.2 Results

5.2.1 SPSS Results

Category	Factors	P-Value	Accepted Hypothesis	Hypothesis
1-Way ANOVA	Average daily time spent on PUBG → Academic Performance/CGPA	0.000	Alternative	Extended PUBG game time affects academic performance/CGPA.
1-Way ANOVA	Nervous level during gaming session → Academic Performance/CGPA	0.000	Alternative	Students' nervous level affects academic CGPA.
2-Way ANOVA	Undergraduate year, time spent on PUBG → Academic Performance/CGPA	0.000 0.001 9.224	Null Hypothesis (Partially Rejected)	Undergraduate year and PUBG gaming time spent independently have significant effects but their interaction does not affect.
2-Way ANOVA	Felt nervous and felt difficult to control due to worry about PUBG gaming → Academic Performance/CGPA	0.000 0.004 2.185	Alternative	Effect of feeling nervous or losing control due to worry about PUBG their interaction on students' CGPA.
Independent Sample T-Test	Academic Performance/CGPA → Male and Female	0.004 0.002	Alternative	Academic CGPA varies significantly between two gender groups.
Independent Sample T-Test	Academic Performance/CGPA → Male and Female	0.000 0.000	Alternative	Students study time skipping has significant effects on CGPA.

Table 5.1: SPSS Confirmatory Research Results.

5.2.2 SmartPLS Results

Factors	Path Coeff.	P-Value	Result	Hypothesis
H1: PUBG Gaming Intensity → Stress & Anxiety	0.833	0.000	Accepted	High intensity PUBG gaming significantly increases the stress and anxiety levels.
H2: PUBG Gaming Intensity → Academic Disruption	0.340	0.000	Accepted	Increased gaming intensity leads to higher levels of academic disruption.
H3: PUBG Gaming Intensity → Social Engagement	0.894	0.000	Accepted	Higher gaming intensity is positively associated with increased social engagement in gaming circles.
H4: Sleep Quality → Academic Disruption	0.577	0.000	Accepted	Poor sleep quality (high score) is an important factor to academic disruption.
H5: Academic Disruption → CGPA	-1.128	0.038	Accepted	Academic disruption has significant negative impact on the overall CGPA.
H6: Stress & Anxiety → Sleep Quality	0.933	0.000	Accepted	Increased stress and anxiety levels lead to poor sleep quality.
H7: Stress & Anxiety → CGPA	0.503	0.139	Rejected	In this model, Stress and anxiety do not have a significant direct impact on students' CGPA.
H8: PUBG Gaming Intensity → CGPA	0.466	0.013	Accepted	Gaming intensity shows a strong relationship with academic performance.

Table 5.2: SmartPLS (Exploratory Research) Results.

Chapter 6

Discussion

This study will evaluate the effect of prolonged hours of video gaming on the academic performance (CGPA) and mental health of the undergraduate students of Bangladesh. Based on the results, the time spent gaming, studying, sleeping, and socialising impacts psychological health and academic achievement. The finding corroborates the literature and provides further support that overgaming has a significant effect on students' mental health as well as academic outcomes.

6.1 SPSS Discussion

The SPSS analysis of Bangladeshi students illustrated a significant relationship between students' nervous level, undergraduate year, their PUBG gaming behavior, academic performance etc. To test this hypothesis one way ANOVA, two way ANOVA and independent sample t test has been done to get the result. The outcome of one way ANOVA implies there was a significant connection ($F = 17.937$, $\text{Sig.} = 0.000$) between students CGPA and their daily average PUBG gaming time. Hence, gaming too much may have negative impact on academic performance.

Just like that, students who get nervous about not being able to play PUBG had an effect on their CGPA ($F = 81.206$, $\text{Sig.} = 0.000$) too. This indicates that students who have higher levels of nervousness are likely to have significantly lower CGPA. Students who reported they don't get nervous achieved the highest CGPA. It gives hints that dependency on PUBG games have a stronger negative impact on CGPA. This highlights not only too much PUBG gaming time but also emotional connection can badly affect students' academic performance.

Based on analysis using two way ANOVA, CGPA has also an impact on students' Undergraduate Year ($F = 6.043$ and $p = 0.000$) and their average daily time spent on PUBG gaming ($F = 5.411$, $p = 0.001$). Levens test shows assumption of homogeneity of variance was interrupted ($p = 0.000$). Undergraduate year had a significant impact on CGPA which shows academic performance varies across their study years. Moreover average daily time spent on PUBG also shows significant change on CGPA which tells gaming habits are linked with academic grades. Notably the interaction between PUBG gaming time and students' undergraduate year was significant ($F = 9.224$ and $p = 0.000$) which depicts the effect of PUBG gaming on CGPA differs according to the year of study.

In addition, a two way ANOVA was also conducted to analyze how students' nervousness and difficulty controlling worry about PUBG related matters affects their CGPA. Levene's test shows unequal variances within groups ($p = 0.000$). The analysis shows feeling nervous when not being able to play PUBG had a significant impact ($F = 37.779$, $p = 0.000$) on CGPA depicting students facing nervousness are likely to have lower CGPA. Also difficulty controlling worry about PUBG related matters has also significantly impacted on CGPA ($F = 2.199$, $p = 0.004$). Now the interaction between difficulty controlling worry about PUBG related matters and feeling nervous when not being able to play PUBG ($F = 2.185$, $p = 0.070$) depicts that their merged effect did not vary from the individual effect.

Independent sample t-test emphasized both gender variations on CGPA and students study skipping time for PUBG gaming. Gender had a significant effect but a slight effect on CGPA ($t = -1.72$, $p = 0.004$) where female students had slightly better academic performance than male students. Additionally, skipping study time to play PUBG games displayed a strong negative effect on CGPA ($t = 6.301$, $p = 0.000$) which shows that students who indulge in PUBG gaming before their studies their academic performance is poor. Although gender plays a minor role, Behavior patterns like playing habits, especially organizing time and study skipping for playing PUBG are more impactful on students educational achievements.

6.2 SmartPLS Discussion

Bangladeshi undergraduates who play video games for extended periods of time typically feel more stressed. This suggests that playing fewer games is linked to relatively lower stress levels, which is in line with previous research. Furthermore, more gaming time frequently results in less study time, which has a detrimental impact on students' CGPA. Similar trends have also been found in studies carried out abroad. Higher levels of life satisfaction and better living conditions tend to make students more focused on their studies and produce better academic results. However, prior research has shown that poor living conditions are directly associated with lower academic performance. Life circumstances also have a direct impact on emotional health. Undergraduate students in Bangladesh who have had unpleasant emotional experiences report feeling less satisfied with their lives and generally being less happy. According to earlier research, emotionally unstable people are less likely to be happy or satisfied with their lives. In order to improve students' quality of life, they must get enough sleep. According to research findings, maintaining healthy sleep patterns is crucial for maintaining a high degree of life satisfaction, especially among students. It's interesting to note that among Bangladeshi undergraduate students, high levels of stress do not seem to have a major impact on overall life conditions or satisfaction. According to some research, even though the majority of students deal with stress to some extent, it doesn't always stop them from leading reasonably fulfilling lives.

Chapter 7

Conclusion and Future Work

7.1 Conclusion

The effects of excessive PUBG gaming hours on Bangladeshi university students' academic performance and mental health are thoroughly examined in this study. Utilizing SEM based on SmartPLS and a confirmatory statistical analysis based on SPSS, the analysis on gaming behaviour allows for an in-depth investigation of psychological and educational effects.

The discovery indicates that too much gaming through PUBG negatively impacted students' academic performance. The more a student plays PUBG, the less he will succeed and be involved in academics. If people spend more time playing video games, they start feeling more stress, anxiety, and mood swings. This further reduces concentration and productivity. Furthermore, it implies that excessive gaming makes the students sleep late, not engage with their friends, and also affects other daily activities.

According to the analysis, mental health factors mediate the relationship between gaming and academic outcomes. Students with higher psychological distress can be harmed by excessive gaming. The insights gained from SPSS and SmartPLS revealed the gaming effect on mental health and academic performance directly and indirectly, while gradually understanding the relationship between the two over time throughout the study period of gaming.

The results indicate that gaming must be done in balance. Playing Player Unknown's Battlegrounds (PUBG) can be fun and a great source of social interaction, but playing it excessively can have adverse effects on the mental and academic health of Bangladeshi university students.

7.2 Future Work

This work may be extended in several additional ways in future research. If the sample size were larger, the results would be more applicable across Bangladesh. In other words, researchers should see the long-term effects of playing too much PUBG on mental health and academic performance. This study will enhance the understanding of the growing gaming behaviour and its long-term impact on students' lives.

Another research can be done on intervention strategies and creating awareness campaigns or digital well-being strategies to mitigate excessive gaming and sustain a healthy attitude among students. Gender-based analysis may also be used to design more effective and inclusive interventions.

Educational or gamified learning tools as healthier alternatives to over-indulging in gaming can also be investigated by scholars so that students can balance their free-time and academic pressure.

It is also important to complete comparative studies regarding the gaming behaviour of students from different countries, along with the impact on academic and psychological outcomes.

Last but not the least, the prospect of research could also focus on the physiological and physical effects of excessive gaming, such as sleep disorders, eye strain, and lack of physical activity, besides mental disorders like anxiety and depression.

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