

K.E.S.'s PRATAP  
COLLEGE(AUTONOMOUS) AMALNER

(NAAC Reaccredited A++)

Affiliated to K.B.C. North Maharashtra University  
JALGAON



DEPARTMENT OF STATISTICS

T.Y.Bsc

A Project Report on

**“ Are mobile games beneficial for college  
students? “**

Submitted by

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Ratnesh Dnyaneshwar Patil

# PRATAP COLLEGE(AUTONOMOUS) AMALNER

(NAAC Reaccredited A++)



## DEPARTMENT OF STATISTICS

T.Y.BSc

## CERTIFICATE

This is to certify that **Vishal Dileep Mali, Ratnesh Dnyaneshwar Patil** students of T.Y.BSC. (Statistics) in the academic year 2022-2023 has successfully carried out the project work with faithful as well as remarkable finding in accordance to the subject –

**“ Are mobile games beneficial for college students? “**

Under the supervision and guidance of Prof. Mr. J. B. Jain and Assistant Prof. Miss. Saloni. P. Patil.

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**Prof. J. C. Agrawal**

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**Prof. J. B. Jain**

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**Prof. Saloni Patil**

(H.O.D. of Department of Statistics)

# **ABSTRACT**

This study investigates the potential benefits of playing mobile games for college students. The research aims to explore the relationship between playing mobile games and academic performance, cognitive abilities, and well-being among college students. The study uses a quantitative research design and collects data through an online survey. The data is analysed using statistical tools such as descriptive statistics, F test, chi-square test, z-test, and statistical charts and figures. The study finds that playing mobile games in moderation can have potential benefits for college students' cognitive abilities and well-being. However, excessive gaming can lead to negative outcomes, such as addiction and procrastination. The study concludes that mobile games can be beneficial for college students if used in limited time and for relaxation and entertainment purposes.

# **ACKNOWLEDGEMENTS**

I would like to express my sincere gratitude to all those who have supported me in the completion of this project. First and foremost, I would like to thank my primary supervisor, Assistant Prof. Mrs Saloni Patil, for her guidance, encouragement, and invaluable feedback throughout the entire research process. Without her support, this project would not have been possible.

I am also grateful to Prof. Mr. J .C. Agrawal and Prof. Mr. J. B. Jain for their contributions and support throughout the different stages of this project. Their expertise and advice have been instrumental in shaping my research and improving the quality of my work. I would also like to thank all the participants who took the time to complete the survey and share their experiences and opinions.

Your contributions were vital to the success of this study. I am grateful to my friends and family for their unwavering support and understanding during the ups and downs of this project. Last but not least, I would like to acknowledge the resources and tools provided by the library, which have been essential to my research.

Thank you all for your support and encouragement throughout this project.

# **DECLARATION**

We hereby declare that the project entitled,

**“ Are mobile games beneficial for college students? “**

Has been submitted by us for the partial fulfilment of our bachelor degree of science in Statistics during the year 2022-23

We further declare that the analysis has been carried out based on the data collected by us.

<b>Sr No.</b>	<b>Name</b>	<b>Exam Seat No.</b>
1	Vishal Dileep Mali	
2	Ratnesh Dnyaneshwar Patil	

Date :

Place : Pratap College Amalner.

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## **Chapter 1 – Introduction, Objectives, Scope and Limitations of study.**

### **❖ Introduction :**

In recent years, the use of mobile devices for gaming has skyrocketed, especially among college students. While some argue that mobile gaming can be a distraction and a waste of time, others suggest that it may have some benefits, such as improving cognitive skills and reducing stress levels. Given the popularity of mobile games among college students, it is important to investigate whether they are indeed beneficial or harmful for this demographic.

The purpose of this project is to examine whether mobile games are beneficial for college students. Specifically, this study will investigate the participants' mobile gaming habits, preferences, and perceived benefits of playing mobile games. The research questions focus on the participants' mobile gaming habits, the reasons why they play mobile games, and whether they find playing mobile games to be beneficial.

However, concerns have been raised about the potential negative effects of mobile gaming on academic performance, social relationships, and mental health. Some studies have suggested that excessive mobile gaming may lead to addiction, reduced attention span, and decreased academic achievement. Other studies have reported that mobile gaming can have some benefits, such as improving spatial reasoning, problem-solving skills, and hand-eye coordination.

To answer these research questions, a survey will be conducted among a sample of college students. The survey will include questions about the participants' mobile gaming habits, the types of games they play, the amount of time they spend playing mobile games, and the perceived benefits of playing mobile games. The data gathered from the survey will be analysed using statistical tools such as descriptive statistics, F test, chi-square test, and z-test.

### **❖ Objectives :**

- To explore the mobile gaming habits of college students, including the types of games they play, the frequency and duration of their gaming sessions, and their motivations for playing.
- To identify the perceived benefits of mobile gaming among college students, including the cognitive, social, and emotional advantages they associate with playing mobile games.
- To assess the potential drawbacks of mobile gaming among college students, including the impact of excessive gaming on academic performance, social relationships, and mental health.
- To determine whether there are any significant differences in the mobile gaming habits and perceived benefits among college students based on their gender, age, academic major, and other demographic factors.
- To provide recommendations for college students on the appropriate use of mobile games as a leisure activity, taking into account their potential benefits and risks.
- To contribute to the growing body of research on the effects of mobile gaming on cognitive skills, stress levels, and overall well-being among college students.
- To apply statistical tools such as descriptive statistics, F test, chi-square test, and z-test to analyse the data collected from the survey and draw conclusions based on the results.

### **❖ Scope :**

- This project aims to investigate the mobile gaming habits and perceived benefits of playing mobile games among college students.

- The study will focus on a sample of college students from different academic majors and demographic backgrounds to provide a diverse perspective on the issue.
- The project will use a survey method to collect data on the participants' mobile gaming habits, preferences, and perceived benefits and drawbacks of playing mobile games.
- The data collected will be analysed using statistical tools such as descriptive statistics, F test, chi-square test, and z-test to draw meaningful conclusions from the results.
- The project will contribute to the growing body of research on the effects of mobile gaming on cognitive skills, stress levels, and overall well-being among college students.
- The project will provide insights into the appropriate use of mobile games as a leisure activity among college students and inform public health policies aimed at reducing the negative effects of excessive mobile gaming.
- The results of the project may have implications for the development of educational games that can help enhance cognitive skills and academic performance among college students.

#### ❖ **Limitations of Study :**

- Sample size: Depending on the size of the sample, it may be difficult to generalize the results of the study to a larger population.
- Self-reported data: Since the data collection method involves self-reported responses, there may be issues with social desirability bias or inaccurate responses.
- Time constraints: Due to time constraints, the study may not be able to explore all the potential factors that could influence the mobile gaming habits and perceived benefits of college students.
- Limited demographic information: The study may not be able to collect detailed demographic information about the participants, which could limit the ability to identify potential differences in the mobile gaming habits and perceived benefits among different groups.
- Limited scope: The study is limited to exploring the mobile gaming habits and perceived benefits of college students and does not cover other potential factors that could influence cognitive skills, stress levels, and overall well-being.
- Potential confounding factors: The study may not be able to control for all potential confounding factors that could influence the mobile gaming habits and perceived benefits of college students, such as prior gaming experience or pre-existing mental health conditions.
- Contextual factors: The study may not be able to explore the impact of contextual factors, such as the social and cultural context in which mobile gaming occurs, on the mobile gaming habits and perceived benefits of college students.



## **Chapter 2 – Data and Data collection Method**

The data which we collected for our project is **purely primary data**. So, from lots of questions, opinions, suggestions, and guidance of our supervisor we decided to make a questionnaire using google form. In the way of collecting data, we have to decide one thing that is what sample size should be kept to make analysis more convenient and reliable so we decided to stop our collection at **203 responses**.

Making of this form has a so many challenges such as what questions we have to ask, we decided to ask the following questions :

### **❖ Questionnaire :**

- 1 ) Your Name
- 2) Your age
- 3) Do you like to play mobile games ?
- 4) What type of game you like play ?
- 5) How much time you play ?
- 6) For what reason you play mobile game ?
- 7) Are you feel refresh or you feel stressless after playing ?
- 8) what is the benefit of playing a mobile game ?
- 9) Do you feel that playing a mobile game waste your time ?
- 10) What is name of your game you play ?
- 11) Do you think that playing a mobile game beneficial for you ?

### **❖ Cleaning of Data :**

Thereafter collecting responses of all of this data we have to clean this data. For this we check the data for duplicates and remove them. Duplicates can skew our data and make analysis more difficult. Then we remove outliers to prevent them from skewing our analysis.

### **❖ Tabulation of the Data :**

After collecting all the data, we make table of our collected data and sorted in rows and columns of different kinds, different characteristics and as need of our projects. We have done our tabulation using Ms-Excel software in MS-office. Also, we use googles sheets software in developing charts and figures from tables. Tabulation can be used for a variety of purpose, such as analysing survey results, summarizing demographic information. Here we use simple tabulation and coloured tabulation for identifying the data variation and complexity. Given below are some pictures of our data set collected and well arranged in tabulation format:

Are Mobile Games Beneficial for College Students ? (Responses) : Form Responses 1

	J	K	L	M	N	O	
	Choose your P.G. prograr	Your Stream	Your Class	Your Class	Your Class	Your Class	Y
		Bsc	T.Y.Bsc - Statistics				
		Bsc	T.Y.Bsc - Statistics				
		Bsc	T.Y.Bsc - Statistics				
		Bsc	T.Y.Bsc - Statistics				
		Bsc	T.Y.Bsc - Microbiology				
		Bsc	T.Y.Bsc - Microbiology				
		Bsc	T.Y.Bsc - Microbiology				
		Bsc	T.Y.Bsc - Physics				
		Bsc	F.Y.Bsc				
		Bsc	T.Y.Bsc - Physics				
		BA		<a href="#">S.Y.BA</a>			
		BA		<a href="#">T.Y.BA</a>			
		Bsc	T.Y.Bsc - Microbiology				
		Bsc	T.Y.Bsc - Microbiology				

Are Mobile Games Beneficial for College Students ? (Responses) : Form Responses 1

	A	B	C	D	E	F	
1	Timestamp	Your Name	Your Age	Do you like to play mobile	Choose your Program	Your course	Yc
2	1/20/2023 23:17:25	Divesh	18 - 20 years	Yes			
3	1/21/2023 14:35:06	Mali Vishal Dileep	20 - 22 years	Yes			
4	1/25/2023 12:38:23	Saloni Patil	22 - 25 years	Yes			
5	1/28/2023 22:48:10	Mali Vishal Dileep	20 - 22 years	Yes	Under Graduate (U.G.)		
6	1/28/2023 23:47:19	Prajwal Kshatriya	18 - 20 years	Yes	Under Graduate (U.G.)		
7	1/29/2023 12:58:10	Lalit Mahajan	20 - 22 years	Yes	Under Graduate (U.G.)		
8	1/29/2023 12:59:19	Rushikesh suryawanshi	20 - 22 years	Yes	Under Graduate (U.G.)		
9	1/29/2023 14:13:10	Suyog Sunil Kachare	18 - 20 years	Yes	Under Graduate (U.G.)		
10	1/29/2023 14:15:38	Sahil Gopal Ranale	18 - 20 years	Yes	Under Graduate (U.G.)		
11	1/29/2023 14:17:36	Jayesh Manulal Wadile	20 - 22 years	Yes	Under Graduate (U.G.)		
12	1/29/2023 14:21:11	Aniket Dinesh Shinde	20 - 22 years	Yes	Under Graduate (U.G.)		
13	1/29/2023 14:22:33	Shubham Arvind Jethava	18 - 20 years	Yes	Under Graduate (U.G.)		
14	1/29/2023 14:54:25	Gaurav Dnyaneshwar Pa	20 - 22 years	Yes	Under Graduate (U.G.)		
15	1/29/2023 15:58:18	Vasundhara hemant nir	20 - 22 years	Yes	Under Graduate (U.G.)		

Are Mobile Games Beneficial for College Students ? (Responses) : Form Responses 1

	T	U	V	W	X	Y	
	What is the name of the	What type of game you li	How much time you play	For what reason you play	Are you feel refresh or yc	what is the benefit of pla	Do you
	Minecraft	Arcade	10 - 20 minutes	Entertainment	Yes	Improves concentration	Maybe
	Pubg	Action	20 - 30 minutes	Entertainment	Yes	Improves concentration	Maybe
	Home design	Adventure	10 - 20 minutes	to relieve stress	Yes	gain in knowledge	No
	Cricket	Action	10 - 20 minutes	Entertainment	Yes	improves problem solving	No
	Chess	Board	more than 30 minutes	to relieve stress	Yes	relief from stress	No
	Subay suffer	Sports	20 - 30 minutes	to relieve stress	Yes	relief from stress	Maybe
	Real cricket 22	Sports	more than 30 minutes	For enjoyment	Yes	relief from stress	Maybe
	Rat Race 2	Simulation	20 - 30 minutes	to relieve stress	Yes	relief from stress	Maybe
	Hill Climb Racing	Racing	more than 30 minutes	For enjoyment	Yes	relief from stress	No
	Antiyoy	Strategy	20 - 30 minutes	to boost your brain	Yes	improves problem solving	No
	Clash of clans	Battle Royale	more than 30 minutes	Entertainment	Yes	relief from stress	Maybe
	Chess	Puzzle	20 - 30 minutes	to boost your brain	No	Boost memory	Maybe
	Racer	Racing	20 - 30 minutes	For enjoyment	Yes	gain in knowledge	Maybe
	Music tiles	Music	10 - 20 minutes	Entertainment	Yes	relief from stress	Maybe

## **Chapter 3 - Methods and Statistical tools**

There are **various methods** I used in my projects for collecting data, analysing it, making tables, interpreting it, and many more. Here are the following:

**Survey method :** A survey is a research method that involves asking a set of structured questions to a sample of individuals in order to gather information about a specific topic or issue. Surveys can be conducted using various methods such as paper-based surveys, online surveys, telephone surveys, or face-to-face interviews. Here we use google forms to collect information from college students google is the new modern way to collect data virtually without using paper.

**Data scrubbing Method :** It is also known as data cleansing, which is the process of identifying and correcting errors, inconsistencies, and inaccuracies in the data. It involves detecting and handling incomplete, duplicate, incorrect, or irrelevant data to ensure that the data is accurate, consistent, and reliable for analysis. The goal of data cleaning is to improve the quality of data, remove errors, and increase the accuracy of analysis results.

**Data analysis :** we analysed the cleaned data using statistical tools to determine whether mobile games are beneficial for college students or not. We use various statistical tools for this such as chi-square test , descriptive statistics, F test, z test.

**Data Visualization :** Data visualization is the representation of data and information in visual formats such as charts, graphs, and maps. The purpose of data visualization is to provide a clear and concise understanding of complex data and patterns by presenting it in a graphical format that is easy to interpret and analyse. Data visualization is an important tool for data analysis, as it can help to identify trends, patterns, and relationships in data that might not be immediately apparent through numerical analysis alone. Some common types of data visualization include horizontal bar charts, doughnut charts, different pie charts, among others.

**Software's :** We use various software for statistical analysis, such as Microsoft Excel, Google Sheets, R programming and Microsoft Word. The data we collected in the Google Form is then converted into an Excel file and R script for analysis purposes, and we make our interpretation from this file.



R programming software



Microsoft excel



Google sheets

Google  
Sheets



Microsoft word

Here are the **statistical tools** which I used in my project for data analysis and data interpretation :

### ❖ **Descriptive statistics :**

Descriptive statistics describe, show, and summarize the basic features of a dataset found in a given study, presented in a summary that describes the data sample and its measurements. It helps analysts to understand the data better. The correlation coefficient is a simple descriptive statistic that measures the strength of the linear relationship between two interval- or ratio-scale variables (as opposed to categorical, or nominal-scale variables). The correlation coefficient,  $r$ , is a summary measure that describes the extent of the statistical relationship between two interval or ratio level variables. The correlation coefficient is scaled so that it is always between -1 and +1. When  $r$  is close to 0 this means

that there is little relationship between the variables and the farther away from 0  $r$  is, in either the positive or negative direction, the greater the relationship between the two variables.

Pearson Correlation Coefficient Formula

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n \sum x^2 - (\sum x)^2][n \sum y^2 - (\sum y)^2]}}$$

Where  $n$  = Quantity of Information

$\sum x$  = Total of the First Variable Value

$\sum y$  = Total of the Second Variable Value

$\sum xy$  = Sum of the Product of first & Second Value

$\sum x^2$  = Sum of the Squares of the First Value

$\sum y^2$  = Sum of the Squares of the Second Value

### ❖ Chi-square Test for Independence of Two Attributes :

- A chi-square test of independence, also known as a chi-square test of association, to determine whether two categorical variables are related. If two variables are related, the probability of one variable having a certain value is dependent on the value of the other variable. The chi-square test of independence calculations is based on the observed frequencies, which are the numbers of observations in each combined group. When we want to perform a chi-square test of independence, the best way to organize your data is a type of **frequency distribution table** called a **contingency table**. Then we have to define hypothesis based on attributes as
- Null hypothesis ( $H_0$ )**: Variable 1 and variable 2 are **not related** in the population; The proportions of variable 1 are **the same** for different values of variable 2.
- Alternative hypothesis ( $H_a$ )**: Variable 1 and variable 2 are **related** in the population; The proportions of variable 1 are **not the same** for different values of variable 2.

Then we have to find expected values by using the following formula:

$$E = \frac{\text{Row Total } (r) \times \text{Column Total } (c)}{N}$$

If There are expected frequencies less than 5 then pooled them and make new column of them.

Pearson's chi-square ( $X^2$ ) is the test statistic for the chi-square test of independence:

$$X^2 = \sum \frac{(O - E)^2}{E}$$

- $X^2$  is the chi-square test statistic
- $\Sigma$  is the summation operator (it means “take the sum of”)
- $O$  is the observed frequency
- $E$  is the expected frequency

**The degrees of freedom (df):** For a chi-square test of independence, the df is  **$k-p-1$**  where ;  $k$  – no of expected frequencies after pooled and  $p$  is the number of parameters estimated from the (sample) data used to generate the hypothesised distribution.

**Significance level ( $\alpha$ ):** By convention, the significance level is usually 0.05.

If the  $X^2$  value is **greater** than the critical value, or if  $p < \alpha$  then reject null hypothesis otherwise accept it.

### ❖ **Fisher's exact test with Monte Carlo simulation :**

Fisher's exact test is used to determine the significance of the association between two categorical variables when the sample size is small and the assumptions for the chi-square test are not met. The Monte Carlo simulation is used to estimate the p-value when the sample size is too large to calculate the exact p-value, by generating many tables that have the same row and column totals as the observed table and calculating the proportion of tables that are as or more extreme than the observed table. The formula for Fisher's exact test is:

$$p = \frac{(a+b)!(c+d)!(a+c)!(b+d)!}{a!b!c!d!n!}$$

Where;

$p$  – p value

$a, b, c, d$  - values in contingency table

$n$  - total frequency

The Monte Carlo simulation is used to estimate the p-value when the sample size is too large to calculate the exact p-value. The Monte Carlo simulation generates many tables that have the same row and column totals as the observed table, and calculates the proportion of tables that are as or more extreme than the observed table. The formula for the probability of a table under the null hypothesis is the same as the formula for Fisher's exact test.

### ❖ **Two samples Z-test :**

Two-sample Z-test for means is a statistical hypothesis testing technique that is used to determine if the difference between the two population means is not statistically significant. This test is used when the standard deviations ( $\sigma$ ) of the two populations are known. This test can be used when we have a sample from each population and we know the variance for these populations.

**Null hypothesis ( $H_0$ ):** There is no difference between the means of the two populations

**Alternative hypothesis (H<sub>1</sub>)** : There is a significant difference between the means.

The following is **the formula for a two-sample z-test** for means:

$$Z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Whereas ;

$\bar{x}_1$  is the mean of the first sample

$\bar{x}_2$  is the mean of the second sample

$\mu_1$  is the mean of the first population

$\mu_2$  is the mean of the second population

$\sigma_1$  is the standard deviation of the first population

$\sigma_2$  is the standard deviation of the second population

$n_1$  is the number of the data points in the first sample

$n_2$  is the number of the data points in the second sample

To determine the significance of the difference between the means, the calculated z-score is compared to a critical value from the standard normal distribution, based on the chosen **level of significance** (e.g., 0.05 or 0.01). If the calculated z-score exceeds the critical value, then the null hypothesis is rejected in favour of the alternative hypothesis.

## **Chapter 4 – Statistical Analysis, Charts and Figures**

As data after collecting data the main objective is that which test should be apply or how to analyse the data for this, we apply several statistical tools on the data for analysing and interpretation and drawing several conclusions these tests are Chi-square test, z test, correlation, and F-test using Monte Carle simulation so given we discussed the **statistical analysis** :

### **Testing association between age and playing of mobile games using Chi-square test of Independence for two attributes :**

Age	Like to play	Do not Like to play	Total
18 - 20 years	84	39	123
20 - 22 years	43	17	60
22 - 25 years	17	3	20

Test whether playing of mobile games is independent of age of students use 5% level of significance

#### **Hypothesis :**

**H<sub>0</sub>** : playing of mobile games is independent of age of students

**H<sub>1</sub>**: playing of mobile games is dependent of age of students

Table of observed frequencies (o<sub>ij</sub>)

	B1	B2	Total
A1	84	39	123
A2	43	17	60
A3	17	3	20
Total	144	59	203

Table of expected frequencies (e<sub>ij</sub>)

87.25123	35.74877
42.56158	17.43842
14.18719	5.812808

Using excel command : CHITEST

P value = 0.30863856

$\alpha = 0.05$

Comparison : P value >  $\alpha$

**Decision** : H<sub>0</sub> is accepted, so playing of mobile games is independent of age of students

## Testing association between playing of mobile games and Class of students using Chi-square test of Independence for two attributes :

Class of Students	Students Who Play Mobile Games	Students Who Not Play Mobile Games
M.A.	5	2
M.Sc.	8	2
M.Com	2	0
Bsc	70	28
BA	3	2
Bcom	2	1
BBA	6	1
BCA	5	0
Bvoc-Account and Tax	1	0
Bvoc-Food and Tech	2	0
Bvoc-Renew and Management	4	0
Total	108	35

### Hypothesis:

- **Null Hypothesis ( $H_0$ ):** There is no significant relationship between playing mobile games and class of students.
- **Alternate Hypothesis ( $H_1$ ):** There is a significant relationship between playing mobile games and class of students.

Here we using 5 % level of significance

Performing Chi-square test in R programming software :

```
data <- matrix(c(5, 8, 2, 70, 3, 2, 6, 5, 1, 2, 4, 2, 2, 0, 28, 2, 1, 1, 0, 0, 0, 0), nrow = 2, byrow = TRUE)
```

```
row.names(data) <- c("students who play mobile games", "students who not play mobile games")
```

```
colnames(data) <- c("MA", "Msc", "Mcom", "Bsc", "BA", "Bcom", "BBA", "BCA", "Bvoc-Account and Tax", "Bvoc-Food and Technology", "Bvoc-Renew and Management")
```

```
data
```

```
model <- chisq.test(data)
```

```
model
```

### Output :

```
> data <- matrix(c(5, 8, 2, 70, 3, 2, 6, 5, 1, 2, 4, 2, 2, 0, 28, 2, 1, 1, 0, 0, 0, 0), nrow = 2, byrow = TRUE)
```

```
> row.names(data) <- c("students who play mobile games", "students who not play mobile games")
```

```
> colnames(data) <- c("MA", "Msc", "Mcom", "Bsc", "BA", "Bcom", "BBA", "BCA", "Bvoc-Account and Tax", "Bvoc-Food and Technology", "Bvoc-Renew and Management")
```

```
> data
```

```
      MA Msc Mcom Bsc BA Bcom BBA BCA Bvoc-Account and Tax Bvoc-Food and Technology Bvoc-Renew and Management
```



students who play mobile games	5	8	2	70	3	2	6	5	1	2
students who not play mobile games	2	2	0	28	2	1	1	0	0	0

```
> model <- chisq.test(data)
```

```
> model
```

Pearson's Chi-squared test

data: data

X-squared = 6.654, df = 10, p-value = 0.7577

Below is a screenshot of the coding done in R programming software:

The screenshot shows the RGui interface. The 'Untitled - R Editor' window contains the following code:

```
data <- matrix(c(5, 8, 2, 70, 3, 2, 6, 5, 1, 2, 4, 2, 2, 0, 28, 2, 1, 1, 0, 0, 0, 0),
  row.names(data) <- c("students who play mobile games", "students who not play mobile games"),
  colnames(data) <- c("MA", "Msc", "Mcom", "Bsc", "BA", "Bcom", "BBA", "BCA", "Bvoc-A", "Bvoc-B", "Bvoc-C", "Bvoc-D", "Bvoc-E", "Bvoc-F", "Bvoc-G", "Bvoc-H", "Bvoc-I", "Bvoc-J", "Bvoc-K", "Bvoc-L", "Bvoc-M", "Bvoc-N", "Bvoc-O", "Bvoc-P", "Bvoc-Q", "Bvoc-R", "Bvoc-S", "Bvoc-T", "Bvoc-U", "Bvoc-V", "Bvoc-W", "Bvoc-X", "Bvoc-Y", "Bvoc-Z"))
data
model <- chisq.test(data)
model
```

The 'R Console' window shows the output of the code:

```
data: data
X-squared = 6.654, df = 10, p-value = 0.7577

Warning message:
In chisq.test(data) : Chi-squared approximation may be incorrect

> model

Pearson's Chi-squared test
```

P value = 0.7577

$\alpha = 0.05$

Comparison : P value >  $\alpha$

**Decision :**  $H_0$  is accepted, so there is a **not significant relationship** between playing mobile games and class of students.

## Testing equality of means of UG and PG students who play mobile games using two sample Z test :

Number of UG students who play mobile games : 98, 5, 4, 2, 1, 5, 7, 3

Number of PG students who play mobile games : 7, 2, 10

N = 144

Programme of Students	UG	PG
Means	15.625	6.333333
Standard deviation	31.18468	3.299832

We use here 5% level of significance

### Hypothesis :

$H_0 : \mu_x = \mu_y$

$H_1 : \mu_x \neq \mu_y$

$$Z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Z calculated = 3.555623

Z Critical value = 1.96 (for two tail)

Comparison : Z calculated > Z Critical value

**Decision :**  $H_0$  is rejected, so the difference in their average playing of mobile games of UG and PG students is significant.

## Testing association between degree and time duration for playing mobile games :

Class	Time			
	0 - 10 minutes	10 - 20 minutes	20 - 30 minutes	more than 30 minutes
Bsc	11	41	33	13
BA	0	0	2	3
Bcom	1	1	1	0
BBA	0	0	6	1
BCA	2	2	1	0
Bvoc-account and tax	0	0	0	1
Bvoc - Food	0	1	0	1
Bvoc - Renew	1	1	1	1
MA	0	1	4	2
Msc	0	2	3	5
Mcom	0	0	2	0

Use 5 % level of significance

N = 144

### Hypothesis :

**Null Hypothesis ( $H_0$ ):** There is no significant association between the degree and the time duration of for playing mobile games.

**Alternative Hypothesis ( $H_a$ ):** There is a significant association between the degree and the time duration for playing mobile games.

we perform fishers exact test using Monte Carlo simulation in R programming software :

# Create a matrix with the data

data <-

```
matrix(c(11,41,33,13,0,0,2,3,1,1,1,0,0,0,6,1,2,2,1,0,0,0,0,1,0,1,0,1,1,1,1,0,1,4,2,0,2,3,5,0,0,2,0), nrow = 11, byrow = TRUE)
```

# set the row and column names

```
rownames(data) <- c("Bsc", "BA", "Bcom", "BBA", "BCA", "Bvoc-account and tax", "Bvoc - Food", "Bvoc - Renew", "MA", "Msc", "Mcom")
```

```
colnames(data) <- c("0 - 10 minutes", "10 - 20 minutes", "20 - 30 minutes", "more than 30 min")
```

# display the table

data

# perform fisher test using monte carlo simulation

```
fisher.test(data, simulate.p.value = TRUE, B = 10000)
```

Output :

	0 - 10 minutes	10 - 20 minutes	20 - 30 minutes	more than 30 min
Bsc	11	41	33	13
BA	0	0	2	3
Bcom	1	1	1	0
BBA	0	0	6	1
BCA	2	2	1	0
Bvoc-account and tax	0	0	0	1
Bvoc - Food	0	1	0	1
Bvoc - Renew	1	1	1	1
MA	0	1	4	2
Msc	0	2	3	5
Mcom	0	0	2	0



X : No. of students who play mobile games

Y: No. of students think mobile game is beneficial

Using excel command : CORREL

Correlation coefficient = 0.991236

**Conclusion :** A correlation coefficient of 0.991235623 indicates a very strong positive correlation between the variables X and Y, and we can conclude that there is a strong linear relationship between the number of students who play mobile games and the number of students who think mobile games are beneficial.

ii)

M	98	5	3	7	5	1	2	4	7	10	2
N	86	4	3	5	4	1	1	3	2	5	1

M : No. of students who like to play mobile games.

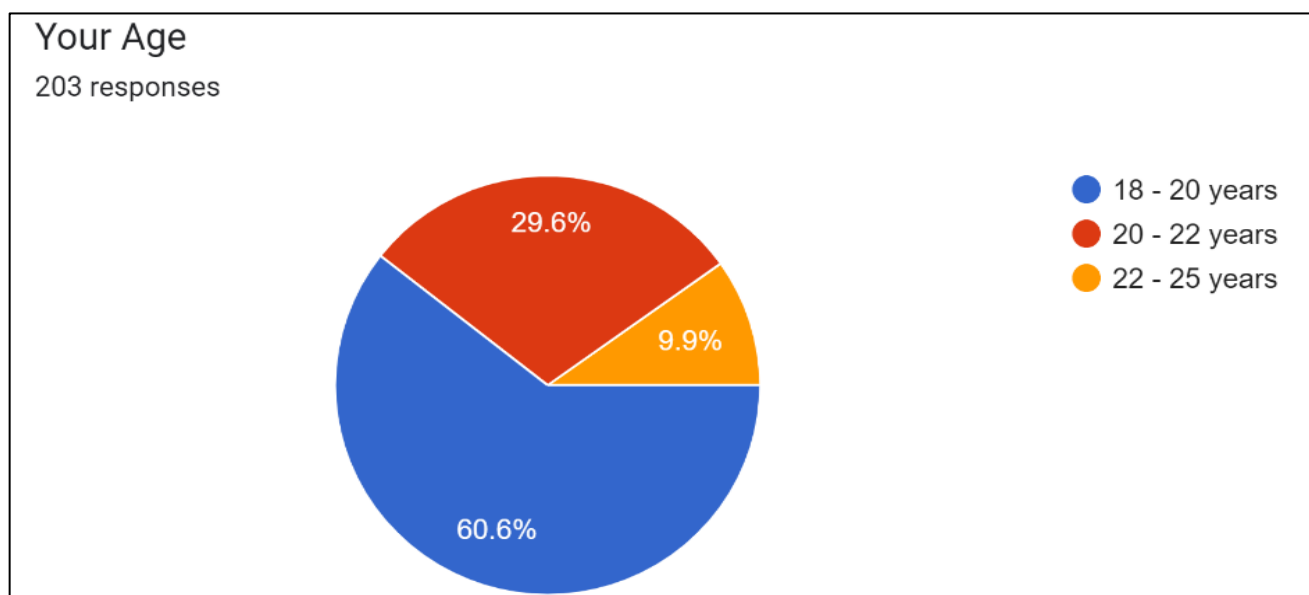
N : No. of students who feel fresh after playing mobile games.

Using excel command : CORREL

Correlation coefficient = 0.998230531

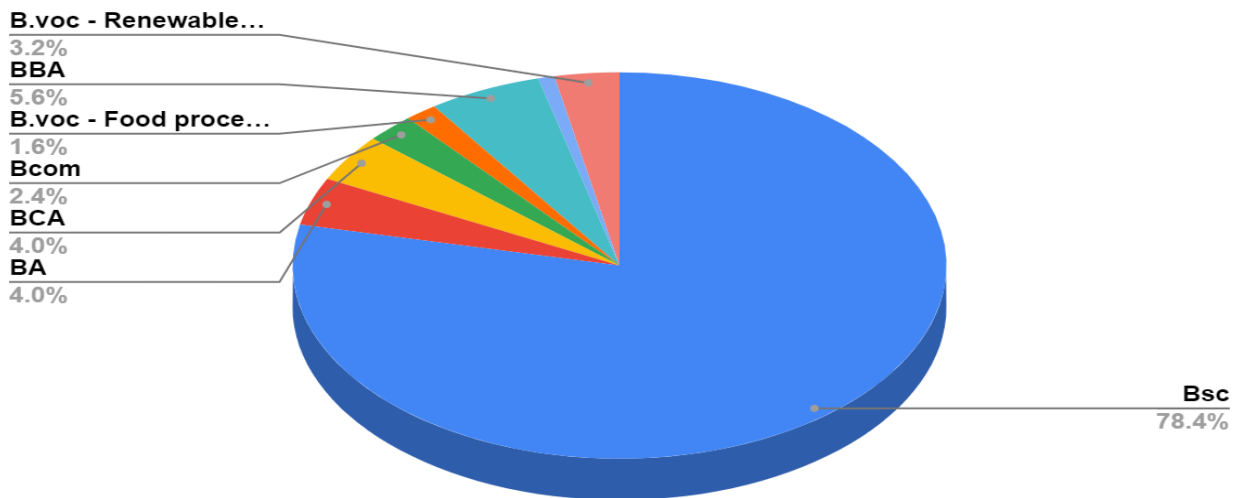
**Conclusion :** A correlation coefficient of 0.998230531 indicates a very strong positive correlation between the variables x and y, and we can conclude that there is a strong linear relationship between the number of students who play mobile games and No. of students who feel fresh after playing mobile games.

Charts and Figures are important in data analysis because they to compare different sets of data easily. They can help us to identify areas of strength and weakness and make informed decisions based on the data so here is the **charts and figures** :



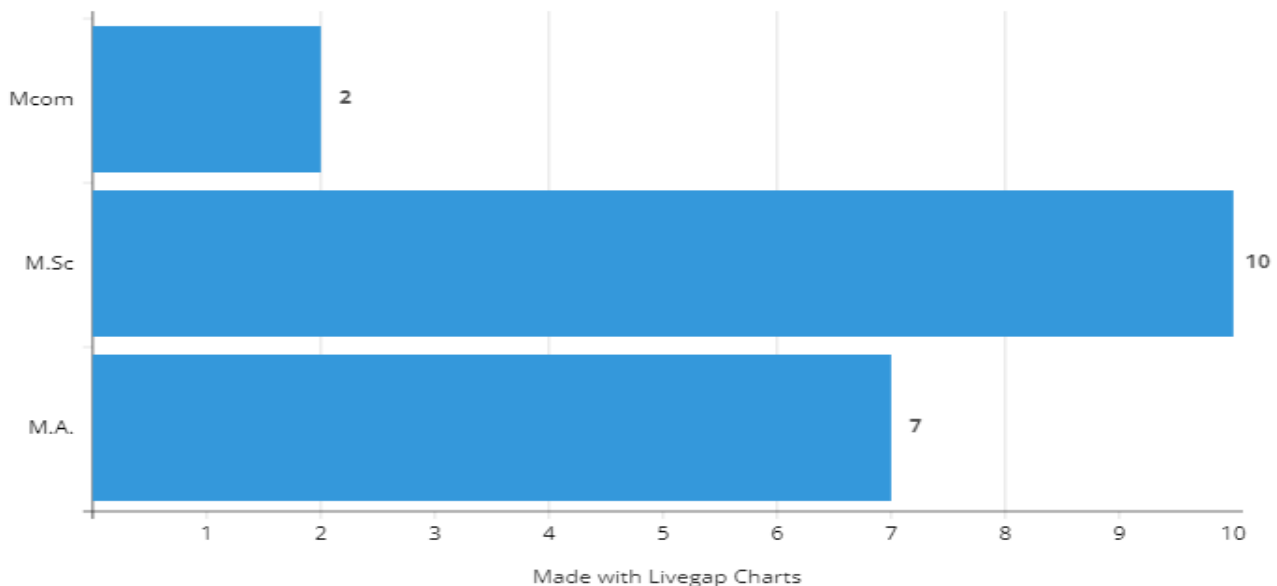
**Conclusion :** from figure we may conclude that students between the age 18-20 years are the most active to play mobile games as compare to students between the age of 20-22 years. The students between the age of 22-25 are mostly PG students which not interested in playing mobile games.

### Streams Selected By Students



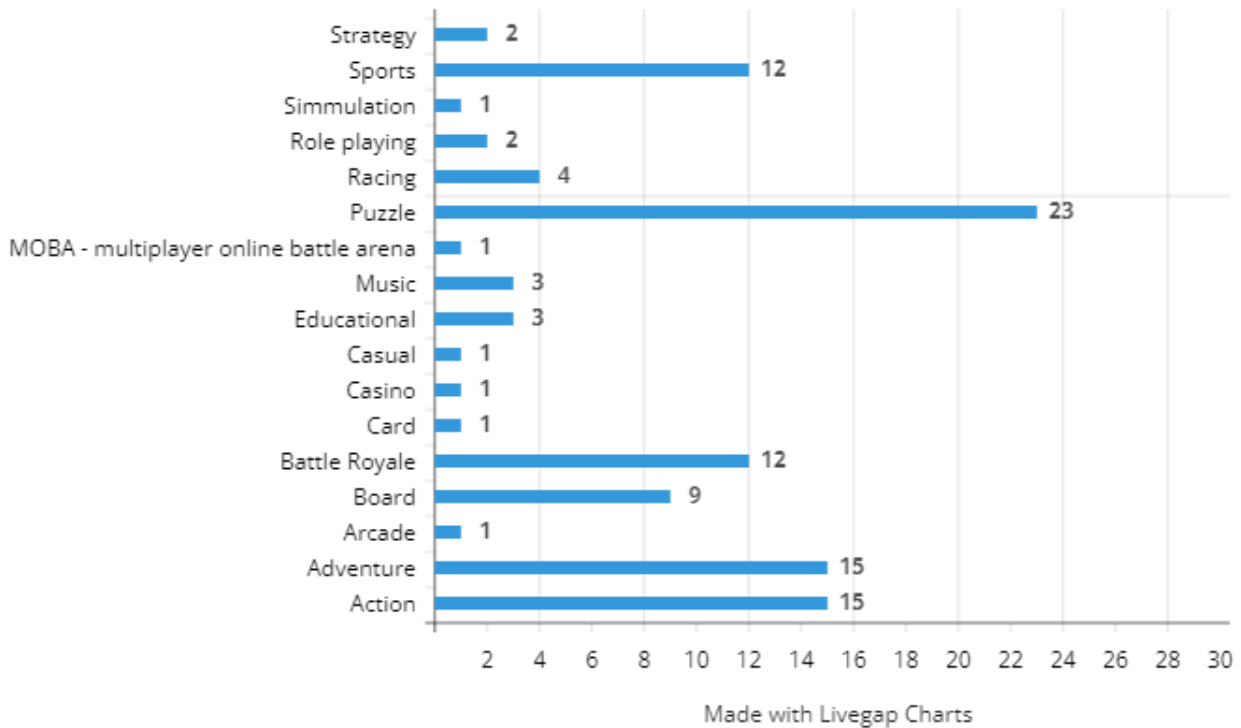
**Conclusion :** BSC students play more games than students in any other class. The remaining BBA and BCA degrees are the second type. The other students in the class don't seem very interested in playing mobile games.

### PG students who play mobile games



**Conclusion :** Due to their heavier workload of studies, PG students are far less interested in playing mobile games than UG students.

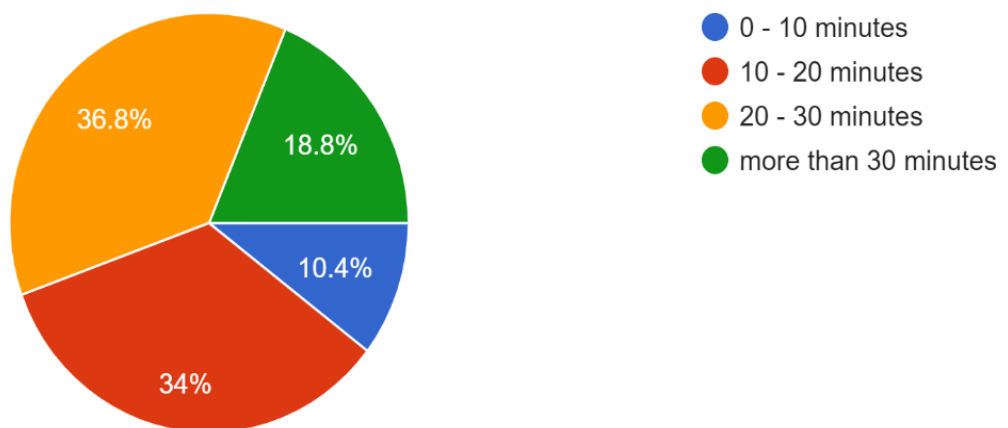
## Types of games played by students



**Conclusion :** The most played types of games are puzzle games. As compared to other games, the majority of students play sports, adventure, and action games.

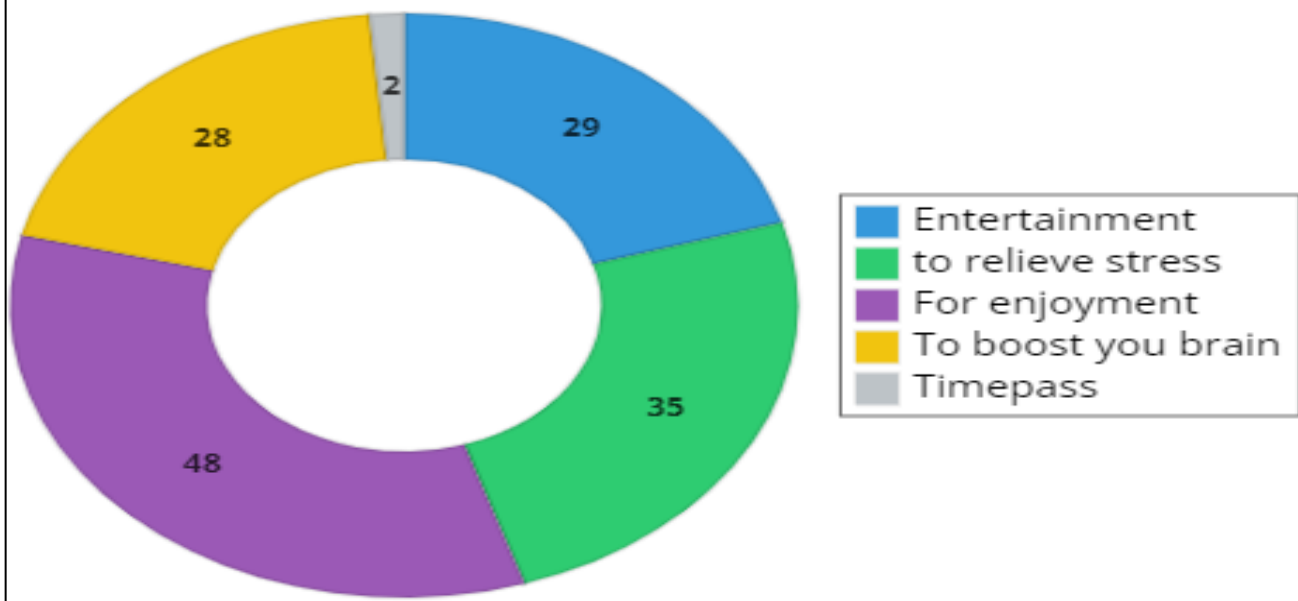
## How much time you play ?

144 responses



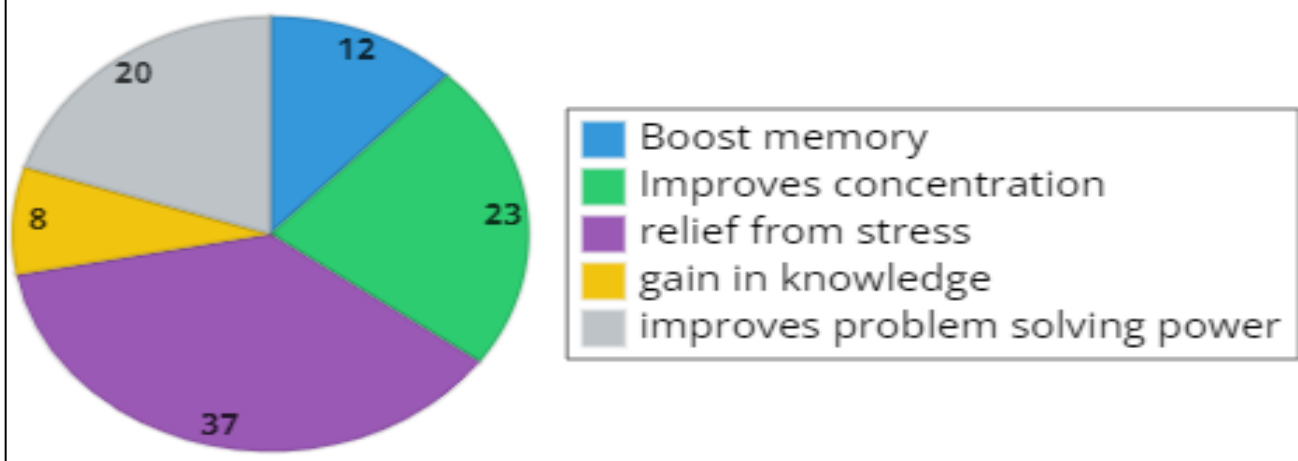
**Conclusion :** For their health and education, it is preferable that most students play for 20 to 30 minutes at a time. 18% of students play games for more than 30 minutes, which indicates that if they don't cut back on their gaming time, they will become addicted to it.

## For what reasons students play mobile games?



**Conclusion :** 48 students are enjoying themselves by playing mobile games, which is helpful for their mental health because it eases tension and stress. However, it is unfortunate to report that two students believe they are merely passing the time because they are unaware of the benefits of playing mobile games.

## Benefits of playing mobile games



**Conclusion :** 37% of students said that playing mobile games helps them to relax. It is a solid percentage and shows that the majority of students are aware of this. 23% of students claimed that playing mobile games helps them focus better. According to 8% of students, playing mobile games helps them learn, which helps them in their studies.



## **Chapter 5 - Conclusion and Recommendations**

### **❖ Conclusions :**

- Age does not seem to have an impact on mobile game usage among students.
- Class also does not have a significant relationship with mobile game usage among students.
- There is a significant difference in the average playing of mobile games between undergraduate and postgraduate students.
- A strong linear relationship exists between the number of students who play mobile games and those who believe that mobile games are beneficial or feel fresh after playing.
- Puzzle games are the most played type of game, followed by sports, adventure, and action games.
- It is preferable for most students to play for 20 to 30 minutes at a time to maintain their health and education.
- Playing mobile games can be helpful for mental health by easing tension and stress, and a significant percentage of students acknowledge this.
- This study has shed light on the importance of understanding the relationship between mobile gaming and college students' academic performance, cognitive abilities, and well-being. Further research in this area could help to develop strategies for responsible and effective use of mobile games among college students.
- Some students who play for more than 30 minutes indicates that they are using mobile for longer time which may lead to mental disorders.
- Students who play mobile games may be comparatively much sharper and more intellectually developed as compared to other students because playing mobile games improves concentration power and creative thinking, so playing mobile games is good for college students if they play them for less than 30 minutes a day.

### **❖ Recommendations :**

- Further research may be required to determine the practical significance of the significant association found between undergraduate and postgraduate students' mobile game usage.
- Since the majority of students play sports, adventure, and action games, game developers may consider focusing on these genres for mobile game development.
- Educating students about the benefits of playing mobile games can increase the number of students who play for relaxation or to improve their focus.
- Encouraging students to limit their mobile game playing time to 20-30 minutes can prevent addiction and improve their academic performance.
- Students who are unaware of the benefits of playing mobile games can be informed about how it can be helpful for their mental health.
- The findings of this research support the idea that mobile games can be a useful tool for relaxation and stress relief among college students, but caution must be taken to prevent addiction and negative impacts on academic performance.
- A qualitative study can be conducted to gather more in-depth insights into students' perceptions of the benefits and drawbacks of playing mobile games.
- According to the study, playing mobile games increases your ability to focus, which aids in developing your academic career.

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