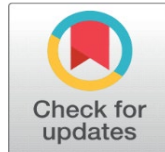
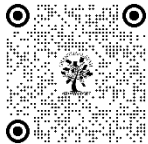


FROM FUN TO ADDICTION: HOW MICROTRANSACTIONS AND LOOT BOXES CONTRIBUTE TO GAMING DISORDER AND MENTAL HEALTH CHALLENGES IN FEMALE ADOLESCENTS

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ABSTRACT

The monetisation of gaming platforms has been researched over the period of time highlighting its limitations involving proper regulation. There are also investigations based on psychological effects that might generate interesting results. The study here attempted to investigate 600 female adolescent gamers from India who are actively a part of the online gaming world. These respondents belong to either government or private schools and colleges equally distributed over the sample. The investigation is undertaken using various statistical tools that help in identifying the perception of these gamers towards such microtransactions. The results showed that the female gamers have a lower level of engagement in real monetary transactions occurring in the virtual world. Majority of them are not involved in any kind of such transactions whereas the minimum of them agree to have bought a loot box. The perception towards such transactions among the gamers are found to be highly aware of the potential risk it might carry and always having a limitation to the spends on them. The gamers are found to be highly conscious of the financial consequences that can occur as a result of participating in such transactions and agree on adhering to them. There are no differences observed in the perception about microtransactions based on them attending either government or private institutions.

Keywords: Microtransactions, Online, Gaming, Adolescents, Female

1. INTRODUCTION

The gaming community is seen to be increasing at a faster rate in the present time. There are several reasons that the researchers point towards such an exponential increase in its users (Akbari et al., 2021; Jones, 2019; McLean & Griffiths, 2019). One of the prime reasons include accessibility with the resources such as the internet and smartphones that make gaming an interesting option for recreation at one's convenience (Pratiwi & Karneli, 2020). The online gaming industry today holds numerous sources of earnings. One of such sources include the microtransactions that the players opt for in the gaming environment (Zendle et al., 2020). This process can be understood as the one where the gamers are involved in a buying mechanism using real life currencies and monetary value to buy items that would benefit them in their game. It is a way for the gamers to move ahead in their journey while a scope for the gaming company to earn money (Tomić, 2019). It is considered to be one of the primary sources of money for the game owners especially when

the gaming platform is provided for free to its users. According to (Statista Research Department, 2024), the online gaming market is expected to reach US\$ 27.9 billion in the year 2024 itself. While the revenue making sources can vary from charging download fees to in-game advertising, the use of microtransaction models using famous applications like Loot box also tops the chart (Clement, 2024). The monetisation of the gaming models using these microtransactions is a sustainable method for the game owners to earn a revenue and broaden their scope of advancement in the market.

The consideration of monetary involvement in such recreational platforms can complicate the situation for certain gamers in many ways (McCaffrey, 2019). As already established by several researchers, the gaming addiction levels can quickly accelerate among individuals (Kuss & Griffiths, 2012; Nwanosike et al., 2022), in such a situation when the need of money to go ahead in the game is required, they can face significant mental backlashes. For example, in the case of an adolescent school girl who plays an online game for fun but gets highly acquainted with it. It allows her to escape from reality and derive satisfaction. But understanding the importance of money even inside the virtual world can give her anxiety leading to mental health issues. The study here attempts to explore the antecedents and consequences of a similar situation where the online gaming behaviour among female adolescent gamers would be enquired through a psychological perspective.

The study here has been resolved based on finding the answers to the following research questions-

RQ1: What do the female adolescents online gamers think about the microtransactions that are facilitated in the online gaming scenario?

RQ2: How does it impact on the gaming disorder levels and mental health issues accumulated by these gamers?

RQ3: Does belonging to either a government or private educational institute differ in their responses towards this situation?

The above research questions would be investigated in a detailed manner using appropriate tools which are gathered from the extensive literature review conducted for the study and is discussed below.

2. REVIEW OF LITERATURE

The role of microtransactions in the gaming world has sourced different revenue generating paths for the owners. This method is established as the a revenue generating model in gaming to buy in-game assets or additional gaming content in exchange of real world currency. This model is known to gain a good sum of advantage in the mobile gaming market especially those posing in a free market but when it comes to console video games designed in the form of loot boxes, there are certain controversies that linger around it. This is mostly due to the additional costs established around it which is limitless in nature. It irks the gamers who have paid an additional amount to play the game and still has to provide additional money to move ahead. Such provisions have laid the generation of a more casino style gaming behaviour realm and complicating the situation around. These can affect the intentions of the players to go forward in the game (Zendle et al., 2020). The generation of a more negative approach with the occurrence of loot boxes in place of appreciation for the aesthetic features that comes with it is established. The literature shows the similarity of such provisions with gambling to be one of the prime reasons for players to develop such intentions. There are factors in this regard such as the number of microtransactions observed in the game, demographics of the gamers and the frequency of payments by the players that play a role in it (Mistry, 2019). There are ethical implications been reported by researchers on microtransactions as well. There are differences established in this regard which include that such as a fixed-reward microtransaction against a loot box. The generation of an advantage to the player having an upper hand in money starts an unfair perspective among the players as well (Palmeira, 2021). The obtainable elements in the game solely on the basis of money against that which can be achieved through in-game effort creates a difference in ethical consideration among the players. (Neely, 2021) in their study talked about how the presence of such options in the online gaming world has created a vulnerable position for certain users such as adolescents. The fear of overspending by such players often regulates the social responsibility aspect of the gaming owners. There is a need for such companies to draw a socially responsible angle when designing the game and frequencies of in-game purchases, the transparency levels of the gaming design and consumer information specificities (King & Delfabbro, 2019). These accuracy levels in the gaming environment can protect the gamers and create these monetising options with much more sincerity. The studies understanding the experience of the video game players in the presence of microtransactions generate a number of interesting results. Their behaviour during such gaming situation involve contrasting situation like generating self-

control or being impulsive, having guilt and regret with the purchases, having a sense of cheating after purchasing these loot boxes, comparing these microtransactions with gambling and generating an obligation to continue playing the game after purchasing (King & Delfabbro, 2019). The level of mental challenges that occur among the gamers on such instances can be alarming and can lead to a number of different consequences.

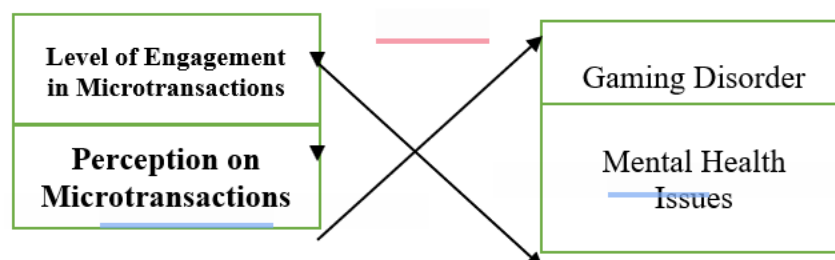
Although countries such as Netherlands, Japan and China have constructed policies on the regulation of loot boxes in gaming (Leahy, 2022), such policies are not highly standardized (Gibson et al., 2023). Moreover, the regulations in each country alter leading to not having a perfect guiding framework to such occurrences. This creates a very vulnerable situation among the gamers, especially those who are already in a critical state of mind (Puiras et al., 2022). The factors of inducing purchase such as feeling inclusive, necessity, a motivation to look cool among the peers, self-expressing medium or even impulse buying are put forward (Nicklin et al., 2021). The analysis of the situation all in all exhibits a critical phase and demands more region and demographic specific research. This study would bridge that gap by narrowing the considered samples into female adolescents residing in the developing economy of India.

3. RESEARCH METHODOLOGY

The purpose of this chapter is to identify the course of action for conducting the study. The designing of the framework is essential as it can help to arrive at the final results of the study with the least amount of error and biases. The attempt in this study is to understand how purchase behaviour in the form of microtransactions in the gaming world can impact the disorder levels and the mental health status of the respondents.

As discussed previously, the population of the study includes the female adolescents in the country of India who are active online gamers. As the specificity of the study demands a number of inclusions in its final set of respondents, a non-probabilistic method of sampling where judgement and convenience sampling are used. The condition that is implemented for the purpose of the judgment sampling is the requirement for the respondents to be in their adolescent years i.e., from 13 to 19 and must be females. The area of consideration for the samples is Delhi NCR area. This location includes a cosmopolitan representation and would generate a more holistic approach to the study. Moreover, the convenience sampling is used to make the data collection process according to the convenience of the respondents. The study focuses on considering an optimum sample size for the data analysis. As the total number of female adolescent online gamers in the country is above a lakh which is considered as an infinite population according to (Krejcie & Morgan, 1970), a minimum sample size of 384 is desired for such a study. Hereby, a total sample size of maximum 600 has been established for the purpose of the study. The collected set of responses would be analysed for missing data analysis and only the set of full data would be considered. As the objective of the study includes the understanding of these responses based on the adolescents belonging to a government or private institution, the data set is divided equally among the ones belonging to a government school/college or a private school/college. The detailed division between the two is shown in the next section of the study.

The secondary sources of data derived from the books, journals, reports and other such documents has been extensively used for the purpose of preparing the research instrument in the study. As surveys are conducted for the study, a structured questionnaire has been designed here using the secondary sources of data. The questionnaire enquired about the demographics of the respondents followed by 5 Point Likert type scales enquiring about social media engagement and the components of microtransactions in gaming, the gaming disorder scale and the mental well-being levels of the respondents. The structured questionnaire prepared here is distributed in both online and offline modes and uses a self-administered method for collecting the data. The conceptual model hereby developed for the purpose of the study is as follows-



The null hypotheses to be tested as a part of the statistical analysis are as follows

H01: There is no significant impact of level of engagement in microtransactions of the female adolescents on their gaming disorder levels.

H02: There is no significant impact of perception on microtransactions of the female adolescents on their gaming disorder levels.

H03: There is no significant impact of level of engagement in microtransactions of the female adolescents on their mental health issues.

H04: There is no significant impact of perception on microtransactions of the female adolescents on their mental health issues.

The conceptual model developed has considered different elements for the purpose of the study. Firstly, the microtransaction engagement level among the female adolescents has been investigated using a thorough scale which enquires about their involvement with activities in loot boxes. It enquires the number of activities that they involve while being engaged in the gaming level. The next set of items attempts to identify the perception they hold about the provision of microtransactions in the online gaming environment. The second scale involved determining the overall mental health issues that arise among the respondents. These items include different aspects and would be extracted using principal component analysis in the study. Thirdly, the gaming disorder scale is used to identify the gaming related psychological issues that have been inserted into the minds of the respondents. To understand each of the scales and deduce the underlying behaviour, the study would use a detailed mean score analysis for each of the scales. Further, to estimate the ability of the scales with respect to this study, its sampling adequacy and factor extraction would be confirmed using principal component analysis (PCA). The relationship between the variables as shown in the model above would be analysed using multiple linear regression. Finally, for the demographic association, there would be a t-test with ANOVA implied.

The next section is dedicated towards providing the detailed data analysis process conducted to fulfil the research questions established in the study.

4. DATA ANALYSIS

The 600 datasets collected as a part of the primary data collection process is analysed in this section of the study. However, before moving into the final course of analysis the demographic composition of the respondents are provided below.

Frequencies of Do you think the online gaming community is biased towards females?						
Do you think the online gaming community is biased towards females?		Counts		% of Total		Cumulative %
No		60		10.0 %		10.0 %
Yes		540		90.0 %		100.0 %

The first screening question for the respondents showed that there are 90% adolescents who believe that there is no biases towards females in the online gaming community. There are however, 10% respondents who agree to the existence of biasness.

Frequencies of Age (in years)					
Age (in years)		Counts		% of Total	Cumulative %
13-14		180		30.0 %	30.0 %
14-15		60		10.0 %	40.0 %
15-16		180		30.0 %	70.0 %
16-17		60		10.0 %	80.0 %
17-18		60		10.0 %	90.0 %
18-19		60		10.0 %	100.0 %

The adolescents in the study are categorised into six different age groups to understand their responses according to different levels of the adolescent phase effectively. It is seen that majority of the female gamers i.e., 30% belonged either to 13-14 years of age group or 15-16 years. The remaining age groups included 10% each. There is a representation from each of the age groups showing a holistic approach towards the study.

Frequencies of Type of Institution				
Type of Institution	Counts	% of Total	Cumulative %	
College	300	50.0 %	50.0 %	
School	300	50.0 %	100.0 %	

Frequencies of Type of Ownership of Institution				
Type of Ownership of Institution	Counts	% of Total	Cumulative %	
Government	300	50.0 %	50.0 %	
Private	300	50.0 %	100.0 %	

The study specifically divides the females included in the study into different types of institutions they are a part of. There are 50% respondents who belong to colleges and 50% who are from schools. The 13 to 15 years are found to be in schools specifically while those from 17 to 19 years are in colleges. Those in the age group of 15 to 17 years are found to be either a part of the colleges or schools. On the other hand, among these females, 50% are studying in a government school or college and the remaining 50% are studying in a private institute which is either a school or a college.

Now, as the demographic divisions are established and show a proportionate division across various categories, the three constructs in the study including – gaming disorder level, mental health issues and involvement in microtransactions are enquired.

There are a total of 62 items in the questionnaire that attempt to understand about the different aspects of the three variables. Firstly, a PCA is conducted with all the items to examine the underlying factors using varimax rotation. The use of this method would clarify the corresponding items in each of the factors by considering those with loadings more than 0.4 to be statistically significant. Moreover, the sampling adequacy of the data collected in relevance to the factors would be done using KMO and Bartlett's test of sphericity.

Bartlett's Test of Sphericity				
χ^2	df	p		
Inf	1891	< .001		

KMO Measure of Sampling Adequacy		
	MSA	
Overall	0.788	
I feel preoccupied with my gaming behaviour	0.820	
I think about previous gaming activity or anticipate the next gaming session	0.790	
I think gaming has become the dominant activity in my daily life	0.800	
I feel more irritability, anxiety or even sadness when I try to either reduce or stop my gaming activity	0.785	
I feel the need to spend increasing amount of time engaged gaming in order to achieve satisfaction or pleasure	0.795	
I systematically fail when trying to control or cease my gaming activity	0.775	
I have lost interest in previous hobbies & other entertainment activities as a result of my engagement with the game	0.800	
I continued my gaming activity despite knowing it was causing problems between me & other people	0.785	
I deceived my family members, therapists, or others because the amount of my gaming activity	0.780	
I play in order to temporarily escape or relieve a negative mood (e.g., helplessness, guilt, anxiety)	0.790	
I have jeopardized or lost an important relationship or educational opportunity because of my gaming activity	0.805	

On the whole, I am satisfied with myself.	0.785	
At times I think I am no good at all.	0.800	
I feel that I have a number of good qualities.	0.770	
I am able to do things as well as most other people	0.795	
I feel I do not have much to be proud of.	0.810	
I certainly feel useless at times.	0.775	
I feel that I'm a person of worth, at least on an equal plane with others	0.780	
I wish I could have more respect for myself.	0.805	
All in all, I am inclined to feel that I am a failure.	0.800	
I take a positive attitude toward myself.	0.790	
My age accurately reflects who I am	0.785	
I have a positive view of myself.	0.800	
I am confident in my abilities	0.775	
I feel accepted by my friends.	0.785	
I am proud of my cultural or ethnic heritage.	0.795	
I am satisfied with my physical appearance.	0.820	
I feel pressure to look a certain way.	0.770	
I compare my appearance to others.	0.800	
My interests and hobbies reflect who I am.	0.785	
I feel pressure to conform to certain interests or activities.	0.790	
My interests and hobbies make me unique.	0.810	
I have clear goals for my future.	0.785	
I like most parts of my personality	0.800	
I am good at managing the responsibilities of my daily life	0.775	
I have warm and trusting relationships with others	0.790	
I had experiences that challenged me to grow and become a better person	0.805	
I am confident to express my own ideas and opinions	0.785	
I have a sense of direction in my life	0.810	
I often feel happy about my life	0.770	
I am interested in my life	0.785	
Overall I am satisfied with my life	0.800	
I feel others are to blame for most of my troubles	0.785	
I feel that most people cannot be trusted	0.795	
I feel that I am watched or talked about by others	0.780	
Others are not giving me proper credit for my achievements	0.810	
I feel that people will take advantage of me if I let them	0.785	
Engaged in 1 activity: Obtained loot box	0.795	
Engaged in 1 activity: Bought loot box	0.820	
Engaged in 1 activity: Sold items from loot box	0.770	
Engaged in 2 activities: Obtained and bought loot box	0.800	
Engaged in 2 activities: Obtained and sold items from loot box	0.785	
Engaged in 2 activities: Bought and sold items from loot box	0.795	
Engaged in all 3 activities	0.785	
Not engaged in any form	0.800	
I am cautious about spending money on microtransactions and loot boxes	0.810	
I have spent more money than I intended on microtransactions or loot boxes.	0.775	
I feel guilty after spending money on microtransactions or loot boxes.	0.780	
Microtransactions and loot boxes enhance my gaming experience.	0.800	
I am aware of the potential risks associated with spending money on microtransactions and loot boxes.	0.785	
I am able to resist the urge to spend money on microtransactions and loot boxes.	0.790	
I actively limit my spending on microtransactions and loot boxes to avoid financial consequences.	0.805	

The overall KMO value is found to stand 0.788 which is above the threshold of 0.7 as suggested by (Hair et al., 2006). Bartlett's test also shows a p-value of less than 0.05 indicating the meeting of sampling adequacy in terms of both the tests.

Here, the PCA results are exhibited using the table below.

Component Loadings													
	Component												Uniqueness
	1	2	3	4	5	6	7						
I feel preoccupied with my gaming behaviour												0.459	0.1100
I think about previous gaming activity or anticipate the next gaming session												0.455	0.2468
I think gaming has become the dominant activity in my daily life												0.881	0.1068
I feel more irritability, anxiety or even sadness when I try to either reduce or stop my gaming activity												0.834	0.1544
I feel the need to spend increasing amount of time engaged gaming in order to achieve satisfaction or pleasure												0.754	0.0950
I systematically fail when trying to control or cease my gaming activity												0.765	0.0445
I have lost interest in previous hobbies & other entertainment activities as a result of my engagement with the game												0.844	0.0578
I continued my gaming activity despite knowing it was causing problems between me & other people												0.765	0.0445
I deceived my family members, therapists, or others because the amount of my gaming activity												0.844	0.0578
I play in order to temporarily escape or relieve a negative mood (e.g., helplessness, guilt, anxiety)												0.778	0.1690
I have jeopardized or lost an important relationship or educational opportunity because of my gaming activity		-										0.676	0.1106
On the whole, I am satisfied with myself.	0.568												0.0335
At times I think I am no good at all.	0.965												0.1106
I feel that I have a number of good qualities.	0.469												0.0652
I am able to do things as well as most other people	0.833												0.0219
I feel I do not have much to be proud of.	0.965												0.1106
I certainly feel useless at times.	0.783												0.0699
I feel that I'm a person of worth, at least on an equal plane with others	0.578												0.0959
I wish I could have more respect for myself.	0.744												0.0752
All in all, I am inclined to feel that I am a failure.	0.981												0.0941
I take a positive attitude toward myself.	0.578												0.0959
My age accurately reflects who I am		0.634											0.0883
I have a positive view of myself.		0.833											0.0219
I am confident in my abilities		0.833											0.0300
I feel accepted by my friends.		0.869											0.0302
I am proud of my cultural or ethnic heritage.		0.877							0.386				0.0452
I am satisfied with my physical appearance.		0.833											0.0219

From Fun to Addiction: How Microtransactions and Loot Boxes Contribute to Gaming Disorder and Mental Health Challenges in Female Adolescents

I feel pressure to look a certain way.			0.869											0.0302	
I compare my appearance to others.			0.783											0.4545	
My interests and hobbies reflect who I am.			0.877											0.0452	
I feel pressure to conform to certain interests or activities.			0.981											0.0941	
My interests and hobbies make me unique.			0.712											0.0949	
I have clear goals for my future.								0.792						0.3636	
I like most parts of my personality								0.648						0.0754	
I am good at managing the responsibilities of my daily life								0.927						0.0929	
I have warm and trusting relationships with others								0.949						0.1405	
I had experiences that challenged me to grow and become a better person								0.793						0.4523	
I am confident to express my own ideas and opinions								0.902						0.0646	
I have a sense of direction in my life								0.981						0.1884	
I often feel happy about my life								0.586						0.0315	
I am interested in my life								0.416						0.3488	
Overall I am satisfied with my life								0.798						0.3683	
I feel others are to blame for most of my troubles					0.430									0.8106	
I feel that most people cannot be trusted					0.511									0.0245	
I feel that I am watched or talked about by others					0.683									0.8534	
Others are not giving me proper credit for my achievements					0.670									0.0245	
I feel that people will take advantage of me if I let them					0.565									0.4371	
Engaged in 1 activity: Obtained loot box										0.908				0.1742	
Engaged in 1 activity: Bought loot box										0.770				0.0195	
Engaged in 1 activity: Sold items from loot box										0.939				0.1107	
Engaged in 2 activities: Obtained and bought loot box										0.939				0.1107	
Engaged in 2 activities: Obtained and sold items from loot box										0.939				0.1107	
Engaged in 2 activities: Bought and sold items from loot box										0.808				0.3425	
Engaged in all 3 activities										0.808				0.3425	
Not engaged in any form										0.488				0.7413	
I am cautious about spending money on microtransactions and loot boxes								0.888						0.1949	
I have spent more money than I intended on microtransactions or loot boxes.								0.622						0.0195	
I feel guilty after spending money on microtransactions or loot boxes.								0.840						0.2239	
Microtransactions and loot boxes enhance my gaming experience.								0.700						0.4798	
I am aware of the potential risks associated with spending money on microtransactions and loot boxes.								0.790						0.3384	
I am able to resist the urge to spend money on microtransactions and loot boxes.								0.904						0.1756	

I actively limit my spending on microtransactions and loot boxes to avoid financial consequences.									0.564						0.6193	
Note. 'varimax' rotation was used																

The table above clearly shows that there are seven factors extracted from the 62 items considered in the study. Looking into these items, it is seen that all the items generate factor loadings of more than 0.4 which suggest the inclusion of all the items in the further course of analysis.

Here is a description of the items as generated in the above table.

Factor	Number of Items	Description
Gaming Disorder Level	11	This represents the behaviour exhibited by the respondents based on their day to day involvement with gaming activities
Self-Esteem	10	It represents the level of respect and ability the respondents hold about themselves
Self-Identity	12	This factor is used to show the perception that the female gamers hold about themselves in their real lives
Psychological well-being	9	It attempts to identify the psychological satisfaction they carry about their lives
Paranoid Ideation	5	This is used to measure the level of paranoia these respondents hold about their surrounding environment
Level of Engagement	8	This factor measures the type of engagement the female gamers are involved in with respect to loot box activities online
Perception on Microtransactions	7	This variable measures the overall perception that the respondents hold about microtransactions in gaming despite their level of engagement with it

The overall mean scores of each of the above extracted factors are provided below to understand the level of agreement shown by each of the respondents about it.

N	Mean	Median	SD	Minimum	Maximum				
Gaming Disorder Level	600		2.71	2.55	1.036	1.36	4.18		
Self-Esteem	600		2.77	2.75	0.510	2.00	3.80		
Self-Identity	600		2.97	2.83	0.711	2.00	3.92		
Psychological well-being	600		2.89	2.83	0.563	2.11	3.67		
Paranoid Ideation	600		2.83	2.80	0.521	2.00	3.80		
Level of Engagement	600		2.58	2.50	0.723	1.50	4.00		
Perception on Microtransactions	600		3.16	3.14	0.981	1.86	5.00		

The mean scores for all the factors are found to be relatively lower. The highest level of agreement is seen with respect to perception on microtransactions at a score of 3.16 and the lowest score is at 2.58 generated for the other factors considered in enquiring about microtransactions. This shows that the level of engagement of the female adolescent gamers are quite low. The gaming disorder level stands at 2.71 which shows a relatively low level of disorder

developed among the respondents due to their gaming activities. The mental health issues measured using the four factors show a mid-level agreement in comparison to the highest and lowest scores. This states that some level of mental health issues can be expected from the female adolescent gamers.

To understand further about the contrasting mean scores generated about microtransactions among the respondents, an item wise mean score analysis is conducted.

Descriptives										
	N	Mean	Median	SD	Minimum	Maximum				
Level of Engagement										
Engaged in 1 activity: Obtained loot box	60 0	2.6 6	3.00	0.944	1	4				
Engaged in 1 activity: Bought loot box	60 0	2.2 2	2.00	1.230	1	5				
Engaged in 1 activity: Sold items from loot box	60 0	2.5 5	2.00	0.957	1	4				
Engaged in 2 activities: Obtained and bought loot box	60 0	2.5 5	2.00	0.957	1	4				
Engaged in 2 activities: Obtained and sold items from loot box	60 0	2.5 5	2.00	0.957	1	4				
Engaged in 2 activities: Bought and sold items from loot box	60 0	2.4 4	2.00	0.958	1	4				
Engaged in all 3 activities	60 0	2.4 4	2.00	0.958	1	4				
Not engaged in any form	60 0	3.2 2	3.00	0.919	2	5				
Perception on Microfinance										
I am cautious about spending money on microtransactions and loot boxes	60 0	3.3 3	3.00	1.334	2	5				
I have spent more money than I intended on microtransactions or loot boxes.	60 0	2.2 2	2.00	1.230	1	5				
I feel guilty after spending money on microtransactions or loot boxes.	60 0	3.3 4	4.00	1.334	1	5				
Microtransactions and loot boxes enhance my gaming experience.	60 0	3.1 2	3.00	1.370	1	5				
I am aware of the potential risks associated with spending money on microtransactions and loot boxes.	60 0	3.7 8	4.00	1.032	2	5				
I am able to resist the urge to spend money on microtransactions and loot boxes.	60 0	2.8 9	2.00	1.372	1	5				
I actively limit my spending on microtransactions and loot boxes to avoid financial consequences.	60 0	3.4 5	3.00	1.067	2	5				

The level of engagement shows that the majority of the respondents with the highest mean score of 3.22 agree to not being engaged in any form of microtransaction. It is followed by a score of 2.66 which shows involvement in one activity which is obtaining the loot box. The lowest score stands at 2.22 which reflects the least conducted activity to be buying a loot box. This analysis reveals the lower level of engagement of the female gamers in microtransactions

involving the loot boxes. The perception about the microtransactions upon being enquired shows the highest score to be 3.78 accepting a high level of agreement about the risks involved in going for microtransactions in online gaming. The second highest stands at 3.45 for being conscious about spending to loot boxes to avoid financial constraints. The lowest score is at 2.22 which shows that the respondents have not spent more than their intended budget on microtransactions. This shows that the female adolescents considered here consider microtransactions not effective and are not highly involved with spending money for online gaming benefits.

In the next analysis, there are multiple linear regressions conducted to test the conceptual model. There are two models enquired, one with gaming disorder level as the dependent variable and the second one with mental health issues as the dependent variable. The results of the study are as follows.

Model Fit Measures					Overall Model Test				
Model	R	R ²	Adjusted R ²		F	df1	df2	p	
1	0.238	0.0566	0.0535		17.9	2	597	<.001	

Model Coefficients – Gaming Disorder Level				
Predictor	Estimate	SE	t	p
Intercept	1.9462	0.1598	12.18	<.001
Level of Engagement	0.0531	0.0366	1.45	0.147
Perception on Microtransactions	0.2660	0.0461	5.77	<.001

This model shows that with a p-value of less than 0.01, the model is statistically significant. The adjusted R2 value stands at 0.0535 which explains a variance of 5.35% on gaming disorder levels based on the unit change of microtransaction response of the female gamers. Observing the coefficients below, it is seen that the perception about microtransactions is the only variable that has a significant impact on the gaming disorder levels. The estimate shows a positive impact and asserts that with gaining clarity about microtransactions and the risks associated with it the gaming disorder levels of the respondents can be improved.

Model Fit Measures					Overall Model Test				
Model	R	R ²	Adjusted R ²		F	df1	df2	p	
1	0.0662	0.00438	0.00104		1.31	2	597	0.270	

Model Coefficients - Mental Health Level				
Predictor	Estimate	SE	t	p
Intercept	2.6852	0.1351	19.8779	<.001
Level of Engagement	8.68e-4	0.0309	0.0280	0.978
Perception on Microtransactions	0.0631	0.0390	1.6191	0.106

The next model on the contrary shows an interesting set of results. It generates a model which is not statistically significant. This corresponds to the fact that the variables of microtransactions among the female gamers cannot be significantly related to mental health levels. This is an interesting result as it totally discards the risk of developing mental health issues based on the microtransaction perception among these respondents. The level at which the female adolescents in this case are involved in loot boxes and other microtransactions, there is no significant risk of developing mental health problems is seen. The adjusted R2 levels if investigated shows a very negligible variance at 0.00104 which is 0.1% caused by the two independent variables declining the presence of any significant impact.

Hence, the status of the hypotheses after conducting the final course of analysis is shown below.

Hypothesis	Status
H ₀₁ : There is no significant impact of level of engagement in microtransactions of the female adolescents on their gaming disorder levels.	Accepted
H ₀₂ : There is no significant impact of perception on microtransactions of the female adolescents on their gaming disorder levels.	Rejected
H ₀₃ : There is no significant impact of level of engagement in microtransactions of the female adolescents on their mental health issues.	Accepted
H ₀₄ : There is no significant impact of perception on microtransactions of the female adolescents on their mental health issues.	Accepted

While these variables show interesting investigating results, the demographic association of the microtransaction perception of the respondents is investigated below using t-tests and ANOVA.

Independent Samples T-Test – Type of Ownership of Institute					
		Statistic	df	p	
Perception on Microtransactions	Student's t	-0.143	598	0.887	
Level of Engagement	Student's t	0.171	598	0.864	

Independent Samples T-Test – Type of Institute					
		Statistic	df	p	
Perception on Microtransactions	Student's t	-0.195	598	0.846	
Level of Engagement	Student's t	-0.225	598	0.822	

The results exhibit interesting insights. It shows that whether the gamer belongs to a private/ government college or a private/ government school, there is no significant difference in their level of engagement in microtransactions or in their perception of microtransactions found. This shows that every respondent involved shows a similar viewpoint about such a monetising system of the online gaming world.

The analysis conducted here has shown an interesting set of results and a detailed discussion on it is provided in the upcoming section.

5. DISCUSSION

The monetisation of gaming platforms has been researched over the period of time highlighting its limitations involving proper regulation. There are also investigations based on psychological effects that might generate interesting results. The study here attempted to investigate 600 female adolescent gamers from India who are actively a part of the online gaming world. These respondents belong to either government or private schools and colleges equally distributed over the sample. The investigation is undertaken using various statistical tools that help in identifying the perception of these gamers towards such microtransactions. The results showed that the female gamers have a lower level of engagement in real monetary transactions occurring in the virtual world. Majority of them are not involved in any kind of such transactions whereas the minimum of them agree to have bought a loot box. These results are in line with the ones provided by (Hunt, 2023; Kristiansen & Severin, 2020) who suggest the lower level of engagement in microtransactions by certain gamers. The perception towards such transactions among the gamers are found to be highly aware of the potential risk it might carry and always having a limitation to the spends on them. The gamers are found to be highly conscious of the financial consequences that can occur as a result of participating in such transactions and agree on adhering to them. These results are also similar to the findings by (Beltagui et al., 2019; Petrovskaya & Zendle,

2022) who state the high level of awareness among the gamers about such monetisation tactics in the online gaming world. The study has also enquired about relationships existing among the micro transaction responses and the gaming disorder levels and mental health levels that these gamers have. It is interesting to note that in case of Indian female adolescent gamers, the gaming disorder level is very meagrely regulated by the perception towards micro transactions. It is not at all impacted by the level of engagement shown by the gamers. On the other hand for mental health levels, the variance caused is particularly low which led to an insignificant development of a regression model. This shows that the microtransaction perception held by the Indian female adolescent gamers is at a secure level where they are highly aware of the consequences and have a planned way of going through such a situation. While there are no differences observed in the perception about microtransactions based on them attending either government or private institutions. The overall analysis of the study here clearly reveals that the need to generate awareness about microtransactions is essential as it can help others in acting in a responsible manner. The engagement of parents in these cases can be effective as they are better able to understand the potential risks and guide their children in making safe online purchasing decisions. Providing resources for parents to be acquainted with such issues along with the adolescent gamers is also critical to discuss these topics at home can reinforce the messages delivered in school. Other than that the need for stronger consumer protection policies that have clear disclosures and age-appropriate restrictions on microtransactions in games targeted at adolescents can be helpful. The inclusion of financial literacy education in school curricula, focusing on digital finance can also help individuals involved in gaming derive a more responsible take. Such education should cover topics like budgeting, recognizing exploitative practices, and understanding the long-term impact of spending habits. A responsible gaming environment creation can help individuals enjoy such activities with utmost ease and effectiveness.

6. CONCLUSION

The study here has shown not only the level of understanding the female adolescent gamers in India hold for micro transactions but has also carefully put forward the potential relationships that it can have. Although in this case, there is no sufficient level of engagement detected, it might not be the case for other categories of online gamers. Discourse of method can be used in the future for understanding the perception of micro transactions among gamers across different regions of the country. This research specifies only the urban adolescent gamers who are exposed to certain information that might not be privy to a rural adolescent gamer. The expansion of the study towards such demographics can generate a different situation and can be highly helpful. They need to design effective policies regulating the ethical application of such transactions is highlighted throughout the study. The future studies can be done to suggest such a framework that can be highly effective in this manner. Further, the impact of such transactions on other aspects of the gamers including long term impact on financial well-being.

CONFLICT OF INTERESTS

None.

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REFERENCES

- Akbari, M., Bahadori, M. H., Bouruki Milan, B., Caselli, G., & Spada, M. M. (2021). Metacognitions as a predictor of online gaming in adolescents: Psychometric properties of the metacognitions about online gaming scale among Iranian adolescents. *Addictive Behaviors*, 118, 106904. <https://doi.org/10.1016/j.addbeh.2021.106904>
- Beltagui, A., Schmidt, T., Candi, M., & Roberts, D. L. (2019). Overcoming the monetization challenge in freemium online games. *Industrial Management & Data Systems*, 119(6), 1339–1356. <https://doi.org/10.1108/IMDS-08-2018-0350>
- Clement, J. (2024, June 5). Gaming monetization - Statistics & Facts. Statista .
- Gibson, E., Griffiths, M. D., Calado, F., & Harris, A. (2023). Videogame player experiences with micro-transactions: An interpretative phenomenological analysis. *Computers in Human Behavior*, 145, 107766. <https://doi.org/10.1016/j.chb.2023.107766>

- Hair, J., Black, W., Babin, B., Anderson, R., & Tatham, R. (2006). *Multivariate Data Analysis* (6th ed.). Pearson Prentice Hall.
- Hunt, D. (2023). Microtransaction spending and problematic gambling of UK university call of duty gamers. *International Gambling Studies*, 23(1), 15–34. <https://doi.org/10.1080/14459795.2022.2046843>
- Jones, A. B. (2019). *Personality and Dark Gaming: The relationships between Perfectionism, the Dark Triad, and Anti-Social Online Gaming Behaviour*.
- King, D. L., & Delfabbro, P. H. (2019). Video Game Monetization (e.g., ‘Loot Boxes’): a Blueprint for Practical Social Responsibility Measures. *International Journal of Mental Health and Addiction*, 17(1), 166–179. <https://doi.org/10.1007/s11469-018-0009-3>
- Krejcie, R. V., & Morgan, D. W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement. Small-Sample Techniques. The NEA Research Bulletin*, 38.
- Kristiansen, S., & Severin, M. C. (2020). Loot box engagement and problem gambling among adolescent gamers: Findings from a national survey. *Addictive Behaviors*, 103, 106254. <https://doi.org/10.1016/j.addbeh.2019.106254>
- Kuss, D. J., & Griffiths, M. D. (2012). Internet Gaming Addiction: A Systematic Review of Empirical Research. *International Journal of Mental Health and Addiction*, 10(2), 278–296. <https://doi.org/10.1007/s11469-011-9318-5>
- Leahy, D. (2022). Rocking the Boat: Loot Boxes in Online Digital Games, the Regulatory Challenge, and the EU’s Unfair Commercial Practices Directive. *Journal of Consumer Policy*, 45(3), 561–592. <https://doi.org/10.1007/s10603-022-09522-7>
- McCaffrey, M. (2019). The macro problem of microtransactions: The self-regulatory challenges of video game loot boxes. *Business Horizons*, 62(4), 483–495. <https://doi.org/10.1016/j.bushor.2019.03.001>
- McLean, L., & Griffiths, M. D. (2019). Female Gamers’ Experience of Online Harassment and Social Support in Online Gaming: A Qualitative Study. *International Journal of Mental Health and Addiction*, 17(4), 970–994. <https://doi.org/10.1007/s11469-018-9962-0>
- Mistry, K. (2019). P(L)aying to Win: Loot Boxes, Microtransaction Monetization, and a Proposal for Self-Regulation in the Video Game Industry. 71 *Rutgers U.L. Rev.*, 537.
- Neely, E. L. (2021). Come for the Game, Stay for the Cash Grab: The Ethics of Loot Boxes, Microtransactions, and Freemium Games. *Games and Culture*, 16(2), 228–247. <https://doi.org/10.1177/1555412019887658>
- Nicklin, L. L., Spicer, S. G., Close, J., Parke, J., Smith, O., Raymen, T., Lloyd, H., & Lloyd, J. (2021). “It’s the Attraction of Winning That Draws You in”—A Qualitative Investigation of Reasons and Facilitators for Videogame Loot Box Engagement in UK Gamers. *Journal of Clinical Medicine*, 10(10), 2103. <https://doi.org/10.3390/jcm10102103>
- Nwanosike, C. L., Ujoatuonu, I. V. N., Kanu, G. C., Ike, O. O., & Okeke, T. J. (2022). Social Bullying Among Undergraduates: The Roles of Internet Gaming Disorder, Risk-Taking Behavior, and Internet Addiction. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.830794>
- Palmeira, M. (2021). The interplay of micro-transaction type and amount of playing in video game evaluations. *Computers in Human Behavior*, 115, 106609. <https://doi.org/10.1016/j.chb.2020.106609>
- Petrovskaya, E., & Zendle, D. (2022). Predatory Monetisation? A Categorisation of Unfair, Misleading and Aggressive Monetisation Techniques in Digital Games from the Player Perspective. *Journal of Business Ethics*, 181(4), 1065–1081. <https://doi.org/10.1007/s10551-021-04970-6>
- Pratiwi, R., & Karneli, Y. (2020). The Contribution of Online Gaming and Peer Conformity to Student Bullying Behavior. *Jurnal Aplikasi IPTEK Indonesia*, 4(3), 155–161. <https://doi.org/10.24036/4.34375>
- Puiras, E., Oliver, C., Cummings, S., Sheinin, M., & Mazmanian, D. (2022). Motives to engage with or refrain from gambling and loot box content: an exploratory qualitative investigation. *Journal of Gambling Studies*, 39(2), 779–794. <https://doi.org/10.1007/s10899-022-10116-8>
- Statista Research Department. (2024). *Online Games - Worldwide*. Statista.
- Tomić, N. Z. (2019). Economic model of microtransactions in video games. *Journal of Economic Science Research*, 1(1). <https://doi.org/10.30564/jesr.v1i1.439>
- Zendle, D., Meyer, R., & Ballou, N. (2020). The changing face of desktop video game monetisation: An exploration of exposure to loot boxes, pay to win, and cosmetic microtransactions in the most-played Steam games of 2010–2019. *PLOS ONE*, 15(5), e0232780. <https://doi.org/10.1371/journal.pone.0232780>