
GAMIFICATION CONTRIVANCE & INFLUENCE ON HUMAN BEHAVIOUR

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ABSTRACT

The primary objective of Gamification, which is the implementation of having a blueprint of a game containing elements within non-gaming factors, is to influence human behavior into performing a desired business outcome. Our research is conducted in two parts; the first is to establish that gamification alters human behavior through intrinsic motivation, and subsequently we have carried forward our research into a possible business application. Our results show that game design elements can drive business outcomes, app downloads, referrals, for online cab aggregators. We have used statistical tools like R Studio and SPSS, applying ANOVA test and Logistic Regression via primary research through questionnaires. Our findings support the main hypothesis that Gamification can influence human behavior and thus drive positive business outcomes.

Key words: Gamification, Human Behaviour, Motivation, Business, ANOVA, Logistic Regression

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1. INTRODUCTION

Gamification refers to application of game designing elements, in non-game contexts, primarily for the intention of motivating an individual towards a desired outcome. While Gamification has largely found application in learning systems, the application can be extended into healthcare, recruitment, business processes and even defense. The core purpose of applying game design elements into processes is to capture the limited human attention for a longer amount of time, thereby engaging an individual towards a desired outcome. Businesses and Organizations are slowly understanding the unexplored powers of “Gamifying” a process and are thus harnessing its powers to drive positive outcomes. Examples include Google in Payment Wallets, JPMC, Accenture in Recruitment processes, US Army in soldier recruitment and so on. Gamification is a field which has attracted research in the relatively recent past and is still a buzzword, which we attempt to unravel in this paper.

Gamification has found effective application in learning systems. Gamification works along o the ideas of external motivation where people will indeed work harder for the reward, but ultimately gamification will detract from peoples’ internal motivation to learn. Research has revealed that gamified systems return different results with varying types of users. Regular users of gamified systems are mainly intrinsically motivated to use these systems.

In 2002, a famous British coder and game creator of Frak! video game coined the term ‘gamification’ and all across the world multiples singers and rappers celebrated at the latent rhythmic possibilities offered by the term.

This definition is quite fascinating and combines the logic of structural gamification (‘game mechanics’) with content gamification (‘experience design’) thus highlighting the importance of engagement and drives motivation.

2. REVIEW OF LITERATURE

2.1. Gamification in Airbnb: Benefits and Risks

Gamification has been studied in various contexts, but not in P2P platforms. Research has also overemphasized the benefits of gamification ignoring its boundaries and counterproductive impacts. This study addresses these gaps by using Airbnb as a case study for investigating the application and (negative and positive) impacts of gamification on hosts’ motivation and behavior. Secondary data were used for examining the fun ware design of Airbnb, while gamification theory is reviewed for designing a qualitative study with Airbnb hosts for investigating their perceptions and reactions to the Airbnb fun ware design.

The review systems of P2P platforms aiming to direct positive behavior and build trust between hosts and guests follow the gamification principles, i.e. the provision of badges and points to hosts when providing quality services. Others (Xiong & Liu, 2004; Liang et al., 2017) recently advocated the positive impacts of these review systems on platforms’ reputation and revenues by building host-guest trust; attracting reliable hosts and high-quality accommodations; attracting guests by ensuring that hosts will perform appropriately and up to high standards.

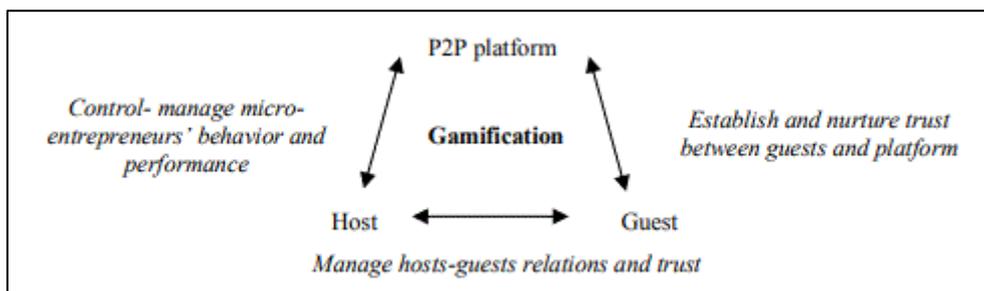


Figure 1 Gamification in P2P platforms

Gaps: Airbnb also requires hosts to construct and present a virtual self for building their image, profile and trust and so, attracting guests. Although studies have examined the Airbnb host brand-identity construction, research has failed to study the impacts of this game mechanic (i.e. role play and self-representation) on hosts’ behavior and motivation.

Figure 1 summarizes the use of gamification for managing host-guest-platform relations. However, there is no research studying gamification on actors’ behavior in P2P.

2.2. Gamification: Self-determination theory vs Comprehensive theory

The validation of personal motivation is affected by a person’s choice to involve in an activity and the potency of applied effort or determination in that activity. The present scenario examines two presiding groups that play a role in determining player’s motivation which is external(extrinsic) and internal(intrinsic) motivation. The methodology of gamifying collaborates both these motivations; on one hand using external rewards such as levels, points, badges to improve engagement while striving to raise feelings of achieving mastery, autonomy, sense of belonging.

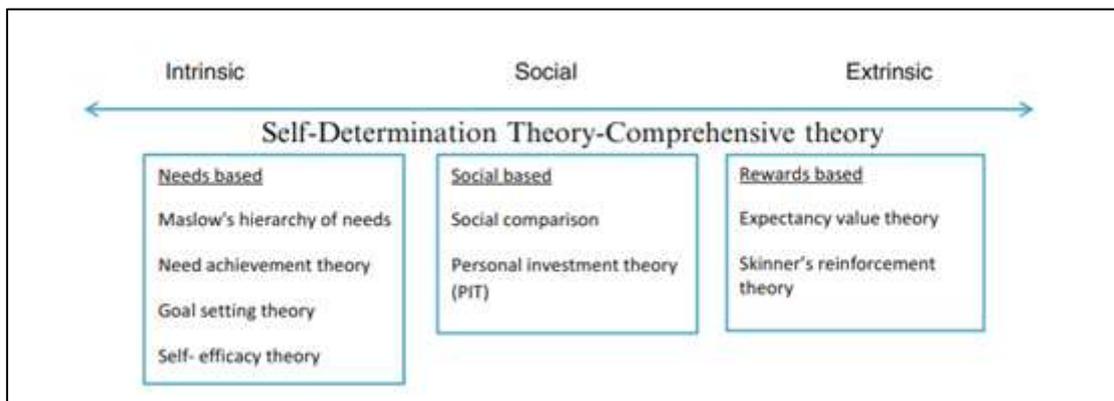


Figure 2 Motivation Theory and Game Elements

Gaps:

- The extent to which Gamification motivates an individual to do a particular task cannot be quantified.
- There have been numerous differences which have seen to exist between the level of an individual’s motivation who play games daily versus the people do not play it every day. The people who played games were identified to be more motivated by gamification.
- How to leverage the motivational effects of Gamification in business context has not been discussed.

2.3. Connection between gamification and serious games

There is a link between serious games and the process of gamification as both of these entities are connected to one another and try to support characteristics of games to gain a motive beyond the degree of casual gameplay. Many a times, playing serious games are a joyous way to deal with realistic obstacles. Gamification thus can be used in an intelligent way to help promote a business or product.

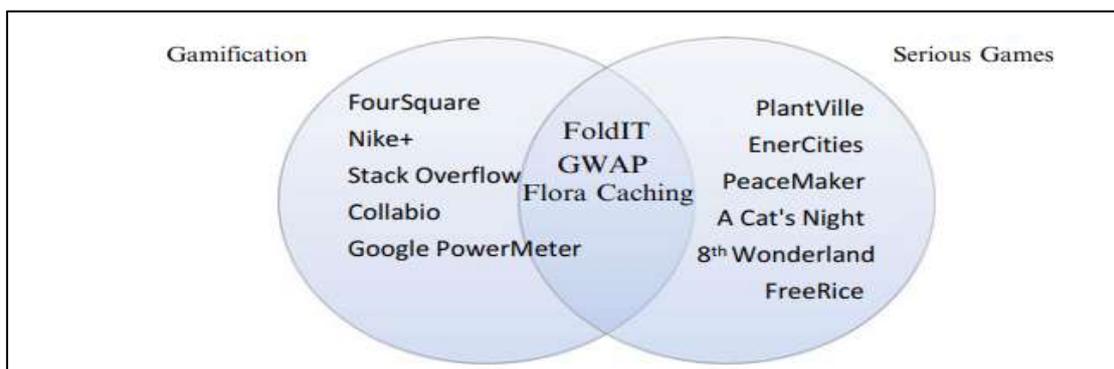


Figure 3 Contrast between Gamification and Serious Games

Gaps:

- The analysis of behavioral changes can help by the observation of multiple cases regarding the fact that how can daily activities be reorganized and considering the facts that how these new models can be related to behavioral belief and principles.
- Academic evidence of the benefits is not satisfactory, and a uniform approach has not been adopted.

2.4. Gamification: Substitution, Augmentation, Modification, Redefinition

These four categorizations of gamification can be put up on a scale ranging from iterative type activities to transformative and game changing activities.

Iterative changes refer to just continuous and repeated application of the presently known gaming elements whereas, transformative change talks about generating path breaking and industry defining innovations.

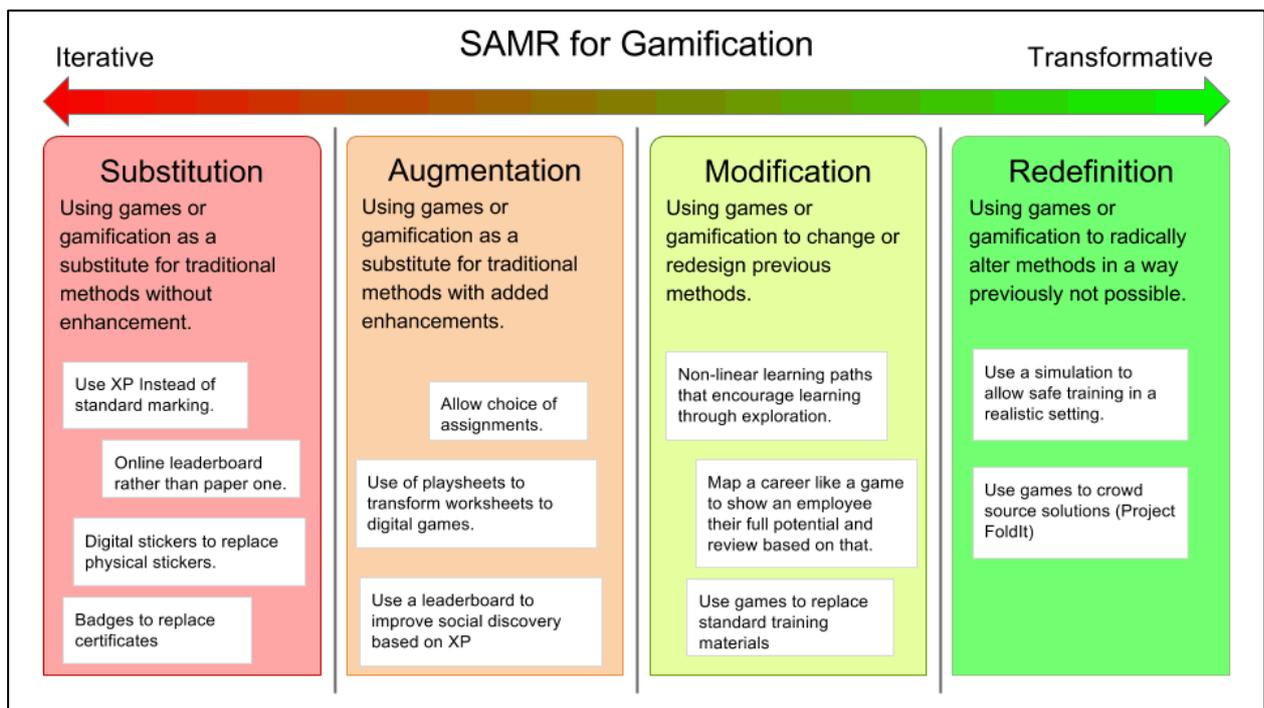


Figure 4 SAMR model for Gamification

Gaps:

- The three aspect which are relevant on gamifying a process could be discussed in a business context.
- A problem arises with the model that most of the research views the concepts of gamification as a general topic , but in reality the multiple models and designs of the gamified environment might be mostly different in nature as compared to the general belief.

3. RESEARCH DESIGN AND METHODOLOGY

3.1. Proposed Research Model

The research model proposed by us considers real-world problems and their impacts. The Gamification approach to drive real world business outcomes needs to be both dynamic and self-sustainable.

The research model is designed around the concept that its application is possible only when the business has a significant digital presence in form of website, mobile application or elements which contains materials which can be controlled, for example your digital blogs and social media profiles, but also materials that you don't control, such as comments and online reviews.

The model focuses on the strategy to engage people in a cycle of gamified experience which will keep them engaged with the user application and thus influence their psychology to spend more time on the application. The duration of total clocked time spent over the application (in-app time) is directly related to the probability of generating more revenue for the business from the application.

The model encompasses six important elements related to gamification, which can be directly incorporated to the application to influence the human psychology. Each of these elements are closely related to one another as they complement each other's effectiveness.

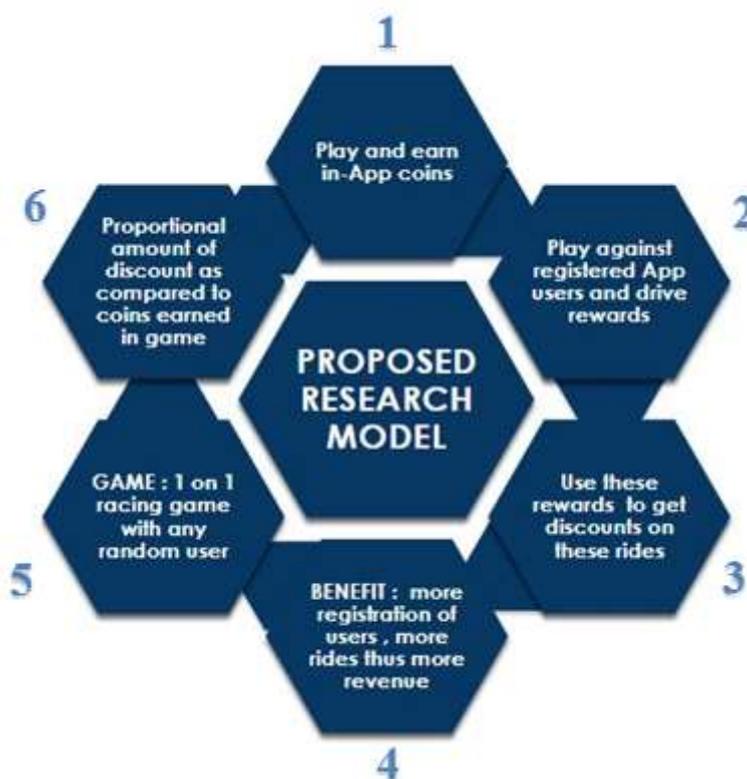


Figure 5 Proposed Research Model

Element 1: The main idea of the model is to add gaming elements to the application which will influence the users to play the games and earn rewards in exchange for same.

Element 2: While playing a game, people feel the urge to battle and win in a serendipitous environment. This type of environment is provided by the element of making users play against other registered users. This brings an urge of competitiveness within individuals and they tend to play even more to be on the top of gaming leaderboard compared to other users.

Element 3: The prizes won by playing games would be converted into extrinsic real world rewards and awarded to the users. The awards can be anything that creates extra value for the customer. Starting from discounts, it can be anything like vouchers or gift items which would hold a value of importance and interest for the user would be offered to them.

Element 4: The core idea of the model is benefit for both the business and the customers/application users. The customer gets benefit in shape of the extrinsic game based rewards, while the main reward for the company is more revenue which will come from customers using the application or their business solution even more after getting influenced by gamified elements implemented by the company.

Element 5: The element that the user will get an opportunity to play live in real time against other user influences their psychology and they tend to take more interest in the game.

Element 6: The last element is most significant from the business aspect. The game model is to be implemented in such a manner that the rewards earned would be proportional to the number or amount(time/level) of game played on the application.

The amount of rewards received should be controlled by the business in such a manner that the business runs in profitability. For example, if we consider to give discounts in return for certain coins earned on the application then the rate of discount would be fixed to a certain number of coins earned. This frequency of the discount would be further controlled and limited by the business to run in profitability.

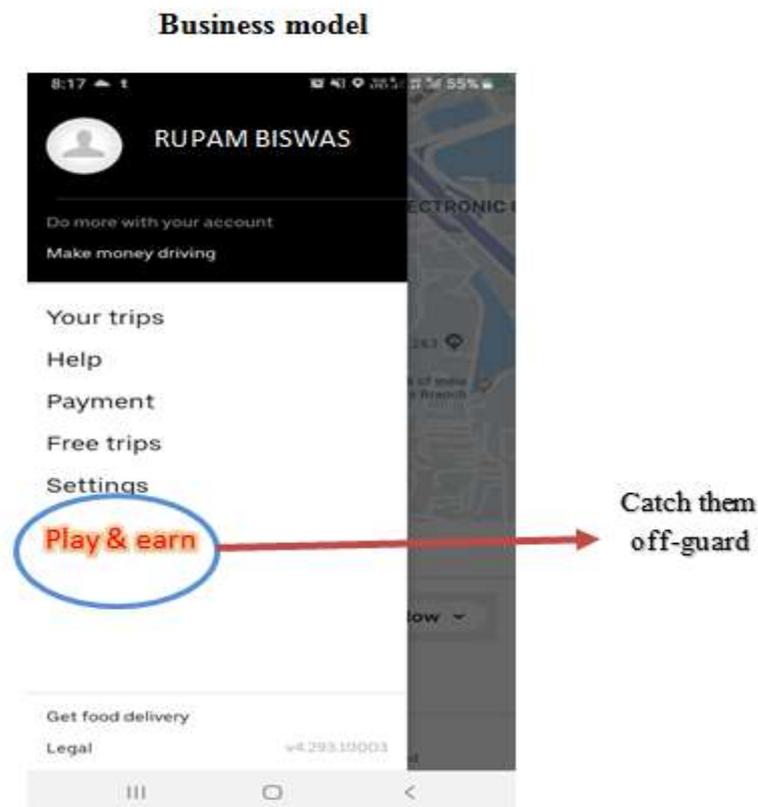


Figure 6 Example of business model

The application of the proposed model can be understood from the given hypothetical business model in which we propose to add gamified element to the Uber application. The main motive of gamification is to attract the attention of the user and for that they have to be caught off-guard at a place where they least expect any element to get gamified.

The notable features of this model would be as follows:

- The user will play one on one live racing game with any other random registered Uber user, who is online at the same time and has a desire to play the game.
- The user will earn coins/points in the game with every race they play and win.
- These coins would be then further converted into real life extrinsic rewards, which in this case is discount on rides.
- The more coins an user earns; the higher cumulative discount they get\ on Uber rides.
- There is a cap on the maximum amount of coins/points a user can earn in a day and the maximum discount they can avail each day.

4. COLLECTION OF DATA

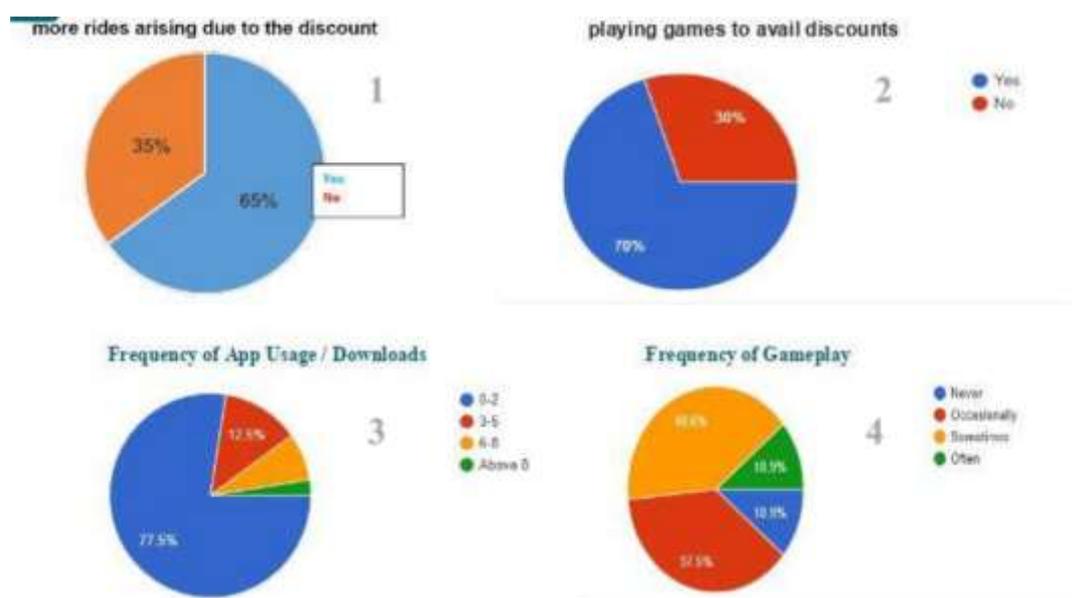
The research has been conducted through the means of primary data collection. The data was collected from the responses registered in two google forms. A total of 105 data points were collected from both the forms and the responses of the same were used to make important inferences after critical analysis using different methods.

The multiple techniques used for the analysis of data include the following:

- Graphical Correlation
- Logistic Regression
- ANOVA test
- Data Normality Test
- Comparative Analysis through graphs & charts

Each of the above mentioned techniques were used to find and define the relationship between the dataset in multiple ways to highlight the significance of gamification to drive business outcomes.

5. DATA ANALYSIS



The graphs shown in the figure above shows us 4 important points from the user perspective:

We can clearly see that the Data we collected is normally distributed, so we go for ANOVA test. Moreover, the result obtained by logistic regression test gives us a clearer relationship between our data set.

6.1. Code Snippet(R)

```
rm(list=ls())

library(caret)

library(e1071)

datas &lt;- read.csv(&quot;data.csv&quot;)

str(datas)

View(datas)

sum(is.na(datas$i.age ))

na_count &lt;-sapply

(datas, function(y) sum(length(which(is.na(y)))))

na_count &lt;- data.frame(na_count)

sapply(datas, function(x) length(unique(x)))

sapply(datas,function(x) sum(is.na(x)))

data &lt;- subset(datas,select=c(2,3,4,5,6,7,8,9,10))

set.seed(100)

trainingRowIndex &lt;- sample(1:nrow(data),
  0.8*nrow(data)) training &lt;-
  data[trainingRowIndex, ] # model training data test
&lt;- data[-trainingRowIndex, ] head(training)

head(test)

model &lt;- glm(recommend ~ effinity + ContEffinity +
  Play2Discount, family=binomial(link=&#39;logit&#39;),
  data=training) summary(model)
```

7. RESULTS OF LOGARITHMIC REGRESSION

Call : glm(formula = recommend ~ effinity + ContEffinity + Play2Discount, family = binomial(link = "logit"), data = training)

Deviance Residuals:

Min 1Q Median 3Q Max

-1.79412 0.00000 0.00000 0.00011 0.75853

Coefficients:

Estimate Std. Error z value Pr(>|z|)
 (Intercept) -18.1437 5280.9045 -0.003 0.997
 effinity -0.2877 1.6073 -0.179 0.858
 ContEffinity 19.5300 5280.9047 0.004 0.997
 Play2Discount 37.0871 7380.9692 0.005 0.996
 (Dispersion parameter for binomial family taken to be 1)
 Null deviance: 19.9123 on 31 degrees of freedom
 Residual deviance: 9.5027 on 28 degrees of freedom
 AIC: 17.503
 Number of Fisher Scoring iterations: 20

Interpretation

Achieving higher Null Deviance values than Residual Deviance value, makes our logistic regression right. As the median achieved is also zero, it hints at the data being normally distributed. The relationship between the dependent and independent variables are being clearly highlighted by this test.

The dependent variable (app recommendation) is directly influenced by discounts, continued frequency of discounts and the factor of playing to get discounts.

Thus, we can conclude that the gamification element influences people to recommend the application to others, which would further lead to more customers and more revenue for the company.

ANOVA Test

anova(model, test="Chisq")
 The Analysis of Deviance Table
 Model: binomial, link: logit
 Response: recommend
 Terms added sequentially (first to last)
 Df Deviance Resid. Df Resid. Dev Pr(>Chi)
 NULL 31 19.9123
 effinity 1 1.1582 30 18.7541 0.281842
 ContEffinity 1 1.0866 29 17.6675 0.297221
 Play2Discount 1 8.1648 28 9.5027 0.004271 **
 Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Interpretation

Through the results of the ANOVA test done on the given data, we can conclude that 'Play2Discount' is the most significant with 'recommend'. This means that recommendation of the app by the users completely depends on the existence of a gaming element in order to achieve discounts.

8. LIMITATIONS OF THE STUDY

Integration of Game Design elements does not prove to be effective in driving outcomes when it comes to the older age group. Awareness should be created among the older people

regarding the positive use of these gamified applications in order to increase the productivity and better results.

- **Game development prerequisites include budget and resources which may be scarce.** Resources such as specific server limits, integrated environment, more strength for research and development team with predefined expertise in the field may be required which can include significant cost for an organization.
- **Reinforcing sales training with gamification.** In order to promote this new idea in terms of business context, training and development may be required in order to guide the people about the effective use of the application.
- **Continuous updates must be integrated.** As we have proposed one-on-one gamified model which will allow the users to play real time games in order to earn free rides which after a certain point of time might become monotonous. So to retain customer engagement and influence new customer base, these gamified apps should be updated regularly.

9. SCOPE & FUTURE WORK OF THE STUDY

- Research can be conducted on how to successfully implement gamification in businesses which don't have a digital presence(apps/websites). As of now this idea needs a server based configuration, so further workaround is required on how to provide the extended support for desktop based applications.
- Game design elements can be formulated for businesses which do not directly translate into a gaming prototype.
- The need to understand what type or form of games do the people prefer to play for e.g. against bot/multiplayer or different game types like action/racing.
- Advanced data analytics can be applied to discover patterns as to how game design elements can alter business outcomes at a very grass root level.
- Subsequent analysis can be used to train machines to alter the gamification models along with changing business models.

CONCLUSION

- From the analysis of our data set, it is evident that the introduction of game design elements in business processes can significantly alter business outcomes. (in our case: higher app downloads, time spent in-app, more transactions & more referrals)
- Also, we take forward our understanding that gamification significantly alters human behavior, and this can be applied to various business for better outcomes.

REFERENCES

- [1] Antonaci, A., Klemke, R., & Specht, M. (2019). The Effects of Gamification in Online Learning Environments: A Systematic Literature Review. *Informatics*, 6(3), 32. <https://doi.org/10.3390/informatics6030032>
- [2] Bridging the gap between psychology and gamification. (2018). Retrieved November 19, 2019, from Science Daily website: <https://www.sciencedaily.com/releases/2018/09/180926082447.htm>
- [3] Gaming away the leadership gap. (2019). Retrieved from Deloitte Insights website: <https://www2.deloitte.com/us/en/insights/focus/behavioral-economics/gaming-away-leadership-gap-developing-leaders.html>

- [4] Morford, Z. H., Witts, B. N., Killingsworth, K. J., & Alavosius, M. P. (2014). Gamification: The Intersection between Behavior Analysis and Game Design Technologies. *The Behavior Analyst*, 37(1), 25–40. <https://doi.org/10.1007/s40614-014-0006-1>
- [5] Sigala, M., Toni, M., Renzi, M. F., Di Pietro, L., & Mugion, R. G. (2019). Gamification in Airbnb: Benefits and Risks. *E-Review of Tourism Research*, 16(2/3), 24–32. Retrieved from <https://search.ebscohost.com/login.aspx?direct=true&db=hjh&AN=134763953&site=eds-live>
- [6] Sailer, M., Hense, J. U., Mayr, S. K., & Mandl, H. (2017). How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction. *Computers in Human Behavior*, 69, 371–380. <https://doi.org/10.1016/j.chb.2016.12.033>
- [7] Deterding, S. (2012). Gamification. *Interactions*, 19(4), 14. <https://doi.org/10.1145/2212877.2212883>
- [8] Sailer, M., Hense, J., Mandl, H., & Klevers, M. (n.d.). *Psychological Perspectives on Motivation through Gamification*. Retrieved from <https://mediatum.ub.tum.de/doc/1222424/file.pdf>
- [9] Mekler, E., Tuch, A., Brühlmann, F., & Opwis, K. (2013). *Disassembling Gamification: The Effects of Points and Meaning on User Motivation and Performance*. Retrieved from https://edoc.unibas.ch/29200/1/20170103085303_586b585faeb58.pdf
- [10] Richter, G., Raban, D. R., & Rafaeli, S. (2014). Studying Gamification: The Effect of Rewards and Incentives on Motivation. *Gamification in Education and Business*, 21–46. https://doi.org/10.1007/978-3-319-10208-5_2
- [11] Alessandro Pagano, & Agostino Marengo. (2019). Game based learning in mobile technology. Retrieved from Gameon website: https://www.academia.edu/41172598/Game_based_learning_in_mobile_technology
- [12] Kocakoyun, S., & Ozdamli, F. (2018). A Review of Research on Gamification Approach in Education. *Socialization - A Multidimensional Perspective*. <https://doi.org/10.5772/intechopen.74131>
- [13] https://www.researchgate.net/publication/256743509_Does_Gamification_Work_A_Literature_Review_of_Empirical_Studies_on_Gamification
- [14] Sailer, M., Hense, J. U., Mayr, S. K., & Mandl, H. (2017). How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction. *Computers in Human Behavior*, 69, 371–380. <https://doi.org/10.1016/j.chb.2016.12.033>
- [15] Healey, D. (n.d.). *Gamification*. Retrieved from https://www.macmillaneducation.es/wp-content/advantage/Gamification_White%20Paper_Mar%202019.pdf
- [17] Lister, M. (2015). Gamification: The effect on student motivation and performance at the post secondary level. *Issues and Trends in Educational Technology*, 3(2). doi: 10.2458/azu_itet_v3i2_lister
- [18] Toda, A. M., Klock, A. C. T., Oliveira, W., Palomino, P. T., Rodrigues, L., Shi, L., Cristea, A. I. (2019). Analysing gamification elements in educational environments using an existing Gamification taxonomy. *Smart Learning Environments*, 6(1). doi: 10.1186/s40561-019-0106-1
- [19] Crowdsourcing Geographic Information With A Gamification Approach.: Resources. (n.d.). Retrieved from <https://eds.a.ebscohost.com/eds/pdfviewer/pdfviewer?vid=6&sid=4a1c613c-32fd-4a3b-9dfc-55464cc0580f%40sdc-v-sessmgr03>
- [20] To stay or not to stay? Discontinuance intention of gamification apps. (2019, December 2). Retrieved from <https://www.emerald.com/insight/content/doi/10.1108/ITP-08-2017-0271/full/pdf?title=to-stay-or-not-to-stay-discontinuance-intention-of-gamification-apps>
- [21] Morford ZH, et al. (n.d.). Gamification: The Intersection between Behavior Analysis and Game Design Technologies. - PubMed - NCBI. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/2727495>