



## Gamification: A Case Study for Evaluating the Performance of Employees

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**Abstract:** Gamification is the application of game theory concepts and techniques to non-game activities. Gamification commonly employs game design elements like point scoring, competition with others, rules of play and others to assess and improve user engagement, organizational productivity, ease of use, and usefulness. Besides its usage in many applications, Gamification can also be employed in applications to evaluate and improve the performance of employees of an organization. This study is aimed to use Gamification techniques in order to assess and improve the performance of employees of a software house who are the programmers. For that, a model based on Gamification framework has been designed. The model consists of key Gamification parameters which have direct intention to evaluate the performance of employees (programmers). After designing the model, a task management app has been developed which implements key Gamification parameters including Points, Badges, Leader boards and Rewards. The app contains some tasks categorized in three different levels of solvability: easy, moderate and difficult. Each task is associated with a deadline to complete the task and some points as a reward; that is, if a task is completed within the deadline some points are assigned to the employee depending on the category of the task. Two parameters are evaluated for employees' performance: task completion within the deadline and the accuracy of completing the task. On the basis of these parameters, performance of employee is evaluated and rewards are assigned. Usability of the app is then tested by conducting a survey from the users of the app in order to measure key parameter like effectiveness, efficiency and satisfaction of the use of the app.

**Keywords:** Gamification, SUS (System Usability Scale), Octalysis, PBL (Points, Badges, Leader boards).

### 1. INTRODUCTION

Gamification is the application of game theory concepts and techniques to non-game activities (Gamification by Design, 2011) (Johannes and Biegler, 2015) Game theory is the branch of mathematics that seeks to understand why an individual makes a particular decision, and how that decision affects others (Dormans, 2012) . (Dennis *et al.*, 2011) Although the word game is used everywhere, the concept of Gamification is different from games. A game can be defined as a fun or an activity that engages an individual for diversion or amusement (Article on Octalysis, 2015) On the other hand, Gamification is "*the application of game design elements and game principles in non-game contexts*". (Sebastian *et al.*, 2011) Because of its feature of adding fun to non-game context, Gamification is being used widely in a variety of applications including marketing, education, health, user engagement and others (Abdul *et al.*, 2017).. Research studies have revealed that the majority of applications based on Gamification have put positive effects on individuals (Reiners, and Wood 2015). On the other hand, traditional working mechanisms employed in real-life applications disengage people from their work which ultimately affects their performance. In order to add fun, joy and entertainment to the activities and keep people focused and engaged in their work, Gamification techniques can be used. The focus of this study is also to use Gamification techniques to evaluate the

performance of employees of a software house who are the programmers/developers. For that, a task management app based on the Gamification Octalysis framework has been developed by employing Gamification parameters which have direct intention towards the working of the employees. These parameter include: Points, Badges, Leader boards and Rewards. The app contains some development tasks like creation of registration form, designing a user interface and log-in form. The tasks are categorized into three levels of their solvability: easy, moderate and difficult. Each task is also associated with some specific time to complete and some points as an appreciation. If a task is completed within the deadline, some points are assigned to the employee depending on the category of the task. An easy task carries five point, whereas, moderate and difficult tasks carry respectively 10 and 15 points each. Two parameters are evaluated for employees' performance: task completion within the deadline and accuracy with which the task is completed. On the basis of these parameters, performance of employee is evaluated and rewards are assigned. Rewards can be of any type depending on the nature of the organization. Some organizations present certificates as a reward and others organize refreshment /lunch/dinner as an appreciation. Usability of the app is then tested by conducting a survey from the users of the app in order to assess and analyze the effectiveness, efficiency and satisfaction of the use of the app.

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## 2. OVERVIEW

The rest of the paper is organized as follows: Section III gives the work related to this study. Section IV specifies the design process of Gamification application. Section V presents the results of the study. Section VI gives discussion of the work and Section concludes the work with suggestion for the future.

## 3. RELATED WORK

Because of its positive effects on individuals, Gamification is being used in almost all fields of life including business, health, education, technology design, and so on (Reiners, and Wood 2015). A survey published by Mashable in 2013 revealed that more than 70% companies of Forbes Global 2000 have planned to use Gamification for marketing and customer retention (Abdul *et al.*, 2017).. A report published in 2014 on "Gamification in e-learning" mentions that "53% of individual believe that by 2020, the use of Gamification will be wide spread in all fields" (Craig., 2015). Many companies have introduced Gamified schemes by using Points, Badges, Leader boards and Rewards in order to increase customer engagement, employees' performance, training, education, personal development, sustainability, health and much more. The prominent online shopping websites like Nike and eBay have also used the concept of Gamification (Zichermann, and Cunningham, 2011). ABANA enterprises a famous Saudi Arabia based company implements Gamification in HR, sales and finance to evaluate employees' performance (Craig., 2015). The company aims to provide hardware and software solutions for banking and telecommunication sectors in Saudi Arabia and has developed its intranet systems by employing key Gamification elements like Points, and Rewards to encourage its employees. The company also uses multiple ways for Gamification usages like training and development center to encourage employees to develop their skills and expertise. Gamification is also used widely in educational institutions in order to enhance the performance of the students. There is a concept of smart boards in educational institutions where students can learn from those smart boards quickly as compared to old traditional style of learning (Article on Octalysis, 2015) Several case studies have been carried out using Gamification in order to track the performance of the employees as well as to enhance their working capabilities by awarding them gifts/rewards (Article on Octalysis, 2015) Companies like Nike, Starbucks, eBay, Salesforce and Badgeville have been very successful by employing game like activities in their apps to improve business and customer communication. JetBlue an online shopping portal site gives rewards in the form of cash (Nora and Balawi, 2015).. So, if any customer uses JetBlue's portal for shopping and spends \$100, he/she earns 3 points per dollar. If the user gains 17600 points, JetBlue offers one way free flight ticket on its selected

routes. Sephora another Saudi based online cosmetics shopping website also operating in many other countries like Bahrain, Qatar etc. uses Gamification techniques to attract its customers (Craig.,2015). This site implements game elements like constraints (spend at least 10 Saudi Riyal to gain points), emotions (customer receives a gift on his/her birthday), competition (competition between employees to reach the top of the mountain), win-state (after completing each level, a popup will appear), rewards (rewards are earned in terms of points, physical gifts and cards after specific time of purchase), achievements (represented with three cards: white for beginners, black after earning 200 points and gold card after earning 1500 points). When a user spends 10 SAR, 1 point will be added to that user's account. The usability of Gamified apps is frequently tested using System Usability Scale (SUS) (Craig., 2015). System usability is defined as "the extent to which a product can be used by specified users to achieve specified goals with respect to effectiveness, efficiency and satisfaction in a specified context of use" (Chung-Ho and Ching-Hsue 2016), The usability of software or application was introduced in 1970. Usability concepts gives many advantages like increase in productivity, customer satisfaction, efficiency, reduced development time and costs, and decrease in training and related costs (Chung-Ho and Ching-Hsue 2016), System Usability Scale was created as a "quick and dirty" scale in order to administer the usability tests on systems including VT100 Terminal ("Green Screen") applications. Due to its increased usage trend, SUS has become an industrial standard with references to over 600 publications (Chung-Ho and Ching-Hsue 2016), The usability of Task Management app. has also been evaluated using SUS with respect to timely completion of tasks (efficiency), accuracy (effectiveness) and user satisfaction. This study also uses SUS to evaluate the use of our Task Management App.

## 4. SYSTEM DESIGN

As mentioned earlier, applying Gamification techniques in a working environment adds joy, fun and entertainment to activities. In this study a web app by employing key Gamification parameters has been developed using ASP.Net and applied to a software house for evaluating the performances of programmers /developers. The app implements two roles: admin and employee (programmer). The admin creates tasks and assigns them to the employee along with time deadline of completion and some points, see (Fig. 1). The initial status of all the tasks is initiated. Once the employee is assigned tasks, he/she change the status of the task from initiated to "In progress". Once the task completes the task, the statues of task is changed from "In Progress" to "Completed", (Fig. 2). Admin can view the status of all the tasks assigned to employees. If the task is completed

and is accurate as per specification, the employee is assigned points depending on the nature of the task.

However, if the task is completed within deadline and is not accurate, no points are rewarded.

Select Project: Tender management System

Select Module: Module 1 of Tender management System

Task Subject: Create Login Form

Task Details: should be Registration as well as forgot password link so that if there is new user, then he / she will have to register first.

Start Date: 10/4/2018 9:00 AM

End Date: 10/4/2018 3:00 PM

Points: 5

Task Assign To: Shahzad Ali

Status: Initiate

Comments: Its an easy task. after completion of task, user had to assign 5 points.

Assign Task

Fig. 1 Admin Role of the App.

View Tasks

Project: Tender management System

Module: Module 1 of Tender management System

Task: Create Login Form

Task Details: Create a responsive login form along with jquery popup. There should be Registration as well as forgot password link so that if there is new user, then he / she will have to register first.

Start Date: 10/4/2018 9:00:00 AM

End Date: 10/4/2018 3:00:00 PM

Points: 5

Status: Initiate

Days Remaining: -5:20 Hours

User Comments:

Admin Comments: Its an easy task. after comple

STATUS	DAYS REMAINING	USER COMMENTS	ADMIN COMMENTS
Initiate	-5:20 Hours		Its an easy task. after completion of task, user had to assign 5 points.
Complete		Task has been completed after the Time	admin comments
Complete		Task has been completed with in	

Fig. 2 Employee Role of the App.

Table 1 System Usability Scale Questionnaire

Q.No.	Question	No: of participants	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	I think that I would like to use this system frequently.	50	32	18	0	0	0
2	I found this system unnecessarily complex.	50	2	17	25	6	0
3	I thought this system was easy to use.	50	22	28	0	0	0
4	I think that I would need to support of a technical person to be able to use this system.	50	1	10	19	15	5
5	I found the various functions in this system were well integrated.	50	38	12	0	0	0
6	I thought there was too much inconsistency in this system.	50	1	18	11	11	9
7	I would imagine that most people would learn to use this system very quickly.	50	38	10	2	0	0
8	I found the system very cumbersome to use.	50	0	4	16	19	11
9	I felt very confident using this system.	50	39	11	0	0	0
10	I needed to learn a lot of things before I could get going with this system.	50	1	2	15	30	2

## 5.

### RESULTS

In order to evaluate the performance of employees, a survey is conducted from 50 participants of a software house who used the app. Questionnaires are based on SUS (System Usability Scale) (Lewis and Sauro 2009), Out of 50 participants 43 were male, and 7 were female. A post-test questionnaire using SUS (System Usability

Scale) was filled by the 50 participants. (Table-1), shows the results of the questions answered by the participants.

Quantitative results are collected for each question of the post-test questionnaire. Based on the standard of SUS (System Usability Scale), overall result is calculated. According to System Usability Scale, the

average score should be 68 out of 100. Table 2 shows the results that are calculated among the survey.

**Table 2 Quantitative Results**

Q.No.	1	2	3	4	5	6	7	8	9	10
N	50	50	50	50	50	50	50	50	50	50
Strongly Agree	12	0	22	1	38	1	38	0	39	1
Agree	28	2	28	10	12	18	10	4	11	2
Neutral	5	17	0	19	0	11	2	16	0	15
Disagree	3	25	0	15	0	11	0	19	0	30
Strongly Disagree	2	6	0	5	0	9	0	11	0	2
Total N	50	50	50	50	50	50	50	50	50	50

## 6. DISCUSSION

Results indicate that by applying Gamification techniques, performance of employees is increased. As compared to traditional working, employees felt happy and engaged while doing their tasks. By comparing traditional task management system and task management system using Gamification technique, it was found that Gamification plays vital role in any organization/software house. If employees feel relaxed to their work, then they can be able to pay full attention to their work and ultimately organization will be more productive. Thus, the results found from SUS (System Usability Scale) remained satisfactory.

## 7. CONCLUSION AND FUTURE WORK

In this research work, Gamification model has been developed for use in a software house. Based on that model, an application was developed in ASP.Net to analyze the performance of the employees. Performance of the employees is measured using the points assigned against the tasks, if completed accurately and within time deadline. If an employee completes the task accurately and within time, it means that he/she is taking interest in the tasks assigned him/her. After developing and implementing app, a survey was conducted to test the usability of the app using SUS (System Usability Scale). 50 programmers of the software house participated in the survey. Almost all the employees responded positively. Based on the results achieved, it is concluded that the incorporation of Gamification techniques increases the interest of the employees in their work. As a result, the performance of the employees is increased and so is the productivity of the organization.

This research can be further extended in education areas, in which researchers can implement Gamification techniques in order to enhance the performance of students in their studies. This research can also be used as an experience in many other fields like online shopping, online quiz, online testing etc.

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