Performance Analysis of Gamification Over the Traditional Classroom in Education

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Abstract
Gamification is widely used in various areas such as education, business and health. The main objective or focus of this paper is to present Gamification as the better way to teach students over the traditional classrooms. To achieve this goal we have created a history based game, targeting undergraduate students who learn this content as part of their syllabus. At each level the details of student’s performance are stored and analyzed. On the other hand, give the same contents to the students through the traditional classrooms. To evaluate the performance we conducted a pre and posttest. The result showed 75% increment in student’s performance.

Keywords: E-Learning, Gamification, Unity 3D

1. Introduction
In this digital era the booming technologies are helping the human efforts to ease. There is no denying fact that technologies are necessarily implements for the development of any industry in modern times. In education fields, there are many changes occurring day by day. The traditional classrooms are shifted to different methods of learning. These dramatic changes will lead the students to achieve more knowledge and result in their curriculum.

E-learning is a method of training in which the learner studies from the virtual professor through electronic media. The word meaning of e-learning is “Learning accompanied via electronic media typically on the internet”. It is a learning by computer equipment access, learning outside the traditional classrooms. Nevertheless it is not carried from CD or DVD we can intermingle with instructor. It is a kind of learning completely based on information technology. E-learning is a type of education which substitute the class room learning by using internet and other information technologies. There are numerous forms of e-learning. It contains various features based on the forms. According to Nicloes Ligualt “there are two ways to conduct e-learning, informal (in this method no scores and no organized way) and formal (in an organized way)” The further way is asynchronous and synchronous. In asynchronous method, it conducts at any time over internet, internet or LAN, CD-ROM, or DVD. The foremost features are hypermedia, interactivity, bookmarking, tracking, and group discussion also. In synchronous method, teachers conduct the class. The features are virtual classrooms, audio-video conferencing, application sharing, shared whiteboard etc.

Gamification is one of the e-learning method. Gamification is a method of learning to involve and encourage students to use educational video games to learn and answer the problem. The objective is to capitalize on enjoyment and assignation over catching the attention of learners and exciting them to remain learning. Gamification, generally defined, as a method of describing the components which include games with fun and positive motivation that encourage players to continue playing, and using those similar elements in a non-game context to effect behavior. There is a variance among the Gamification and game-based learning. The purposes, consequences, and process of implementations are completely different. Gamification helps the user to apply the game design method and game procedure to involve and inspire them to accomplish their goals. In Gamification the learning progression entirely turned into games. The game mechanism is added to the current...
context and try to participate and motivate the learners. Some of the crucial tools present in points, levels, leader boards, and accomplishments badges etc. Gamification does not contain students to manipulative and generating their own games or in occupy them in commercially manufactured video games.

The paper is organized as follows. Section II includes the literature review, which describes about the brief description of the papers referred. Section III contains the methodology, which gives brief narration of different methods used in this paper like unity 3D. Section III explains about the implementation, how to set the story of the game and coding in unity 3D. Section IV, gives the result about the game by using the analysis tool. Section IV shows the effectiveness of Gamification in history learning followed by conclusion in the section V.

2. Literature Review

K. Erenli has discussed about the impact of Gamification in education. Now a days, during free time playing computer game is very interested by many student. Through the game they will achieve some good skills so it is very easy to get well educated knowledge. Several people are ready to teach and evaluate students by using gaming concerns and methods which is known as Gamification. In this paper the author discussed about the past and effect of the Gamification. They explained the real world bridge as Gamification, because it provides a joyful full education and also helps to prevent the additive nature of the game. Gamification will help the students to open their minds towards the educational scenarios. It will make more interest and collaboration to students at all times. Even the teacher also will be interested to use the Gamification.

Hamari J et al. has discussed about the social motivation to use Gamification in education. This article mainly explains in what way social factors says the outlook towards Gamification, purpose of conducting it and endorsing gamified services. To achieve this purpose the authors performed an experiment on 100 people and also conducted a survey. It reveals about theoretical background of the survey. They took five factors and made the research model. According recommended research model, they came out with four strong and valuable points why social motivations strongly agree the Gamifications as well as recommending the gamified services.

Heilbrunn B et al. discussed about analytical tools for Gamification in their research work. The authors discussed about the software solutions to analyze the Gamification project according to user’s requirements. All applications and Gamification data reveals user’s necessities and performance. It will help to analyze the Gamification project. They have given a brief description of 10 software solutions to analyze the Gamification based on user’s 22 requirements, which is from various research. The result was that only 9 requirements were fully satisfied. So they strongly argued current integrated and standalone solutions are not enough to alteration of Gamification projects. They also discussed about technical architecture for common tool for nursing adaptation of Gamification.

Seaborn K et al. discussed about gamification theory and working in their research work. In this paper discussed about important role of the Gamification in various education fields. Based on survey they strongly agreed that Gamification is helpful in increasing user’s motivation and interest even in non-entertainment level. Theoretically there are many exploration going on about the Gamification. However only limited practical experiments are conducted in this field. This survey mainly focused on the theoretical investigation. Hence they suggested pratical study really reveals the extrinsic and intrinsic motivation benefits of the Gamification. So, when we evaluate the Gamification a pratical enquiry is very important.

B. E. Wiggins discussed about the use of games, simulations and Gamification in their research work. The author profiles both Gamification and Game-based learning in higher education. It also focus on the flexibility of the instructors, those who depend on games and simulations in education. The author conducted a survey based on the factors like rate, frequency and likelihood using digital or non-digital games. The result shows that Gamification and Game-based learning is very helpful in education. The author also mentions that non-digital games are very familiar to students as well as mentors, the digital games are unskilled to them. Author observed that Gamification is the repackaging version of both traditional and practical learning. Eventhough some issues are included in the Gamification, it is better and suitable way to motivate and engage students in education. Hence the author strongly suggests to include Gamification in higher education, which will help students as well as teachers.
3. Implementation

In implementation, the first and foremost aim is to develop a game by using Unity 3D. Unity is a game engine industrialized by Unity technology, we can create 2D or 3D game and install across mobile, desktop, VR/AR support or platform. We developed a game, which is based on Indian history and named as ‘AWAKENING’. It is the part of the history course curriculum for the students those who are pursuing under graduate degree. It explains about cultural awakening, religious and social reforms in India before independence. It includes western impact, and origin of Brahmo Samaj, Arya Samaj, Prarthana Samaj and Ramakrishna movements which lead India into a new horizon and tried to defeat the religious and social superstitions as well as unwanted customs.

The entire game contains four different modules. In module 1, the users will get two options, that is, member login and sign up. After the sign up procedure, the user can login, by using their email id and password. At first a demo is provided about how to play the game. It also score the marks by spheres and character. Module 2, it gives the introduction to subject, helps the user going to learn via this game. The main focus of this module is the western impact in Indian culture and reasons for establishing social and cultural reform movements through texts and images. The entire game have the sound effects.

Module 3, it includes four levels, each level explains four different social reform movements. Level 1 cover the Brahmo Samaj, level 2, Arya Samaj, level 3 and level 4 is about Prathana Samaj and Ramakrishna movements respectively. Each level have 3-6 books which include different social reform movements held in the India before the Independence. Every level the player should collect all the books and go through contents by controlling the character. The information about the number of books will mention top right side of the screen in respective level. By using user id, the time taken by each player to collect all the books will store in the database within seconds. This time also one of the criteria to evaluate the player’s performance. Based on the content of the each level four multiple choice questions will be asked to the player with three options. The total number of questions of entire game is 16. The entire game has 4 lives. According to the number of wrong answers life will reduce. If the player losses full lives without completing entire level, the game will start from beginning - from the introduction part.

Module 4, includes the result part, based on the number of correct answers and time taken a rank will provide to the player. The result will shows the name of the player, total time taken to complete the entire game, total number of questions, number of correct answers and number of wrong answers. The below Figure (1,2,3,4,5,6,7) shows the different modules of the game.
4. Results

To evaluate, the player conducted both pre-test and post-test based on the skills and marks. Table 1 and Figure 8 gives the results about the skills for both pre and post test.

Table 1. Pre and post test skill results

<table>
<thead>
<tr>
<th>Skills</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem solving skill</td>
<td>37%</td>
<td>48%</td>
</tr>
<tr>
<td>Logical skill</td>
<td>15%</td>
<td>28%</td>
</tr>
<tr>
<td>Analytical skill</td>
<td>20%</td>
<td>34%</td>
</tr>
<tr>
<td>Creative thinking skill</td>
<td>28%</td>
<td>45%</td>
</tr>
</tbody>
</table>

Figure 8. The pre and post test results of the student’s skill evaluation.

Table 2. Overall pre and post test results

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 30</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>Below 40</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>40-50</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>50-60</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>60-70</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Above 70</td>
<td>5</td>
<td>18</td>
</tr>
</tbody>
</table>

Figure 9. Students Performance in Pre and Post test.
5. Conclusion

Gamification is one of the learning method, with the help of the digital and non-digital equipment. Now a days Gamification has significant role in education. It is very interesting, motivating, and very helpful. It improve logical skills, problem solving skills and analytical skills of the students. In this paper the implementation its effectiveness are shown. From the results it is evident that that Gamification is best way to improve student’s performance over the traditional classroom. From the result, Gamification can be strongly suggest in our educational system in the class rooms. From the result we can also see that it is very helpful for the students as well as the instructors.

6. References

7. Available from: Crossref.