Understanding Gamification for Data Collection and the Role Played by Reward and Value in Game Systems

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Abstract

With the rise of inventions in the digital society, data tracking and selling has gotten much easier. Shoshana Zuboff's definition of "surveillance capitalism" describes the mass monetization of personal data of individual users of the internet online to predict and modify behavior; at the same time surveillance can be seen as a gamified system which doles our rewards after it tracks our progress online (Benjamin, 2019).

In order to understand gamification on the internet, this study primarily tries to look at game mechanics and understand a digital gamer's behavior. In order to understand gamification of a system, concepts of control and reward systems on the internet, the study has aimed to understand how control and rewards play a role in game and for a gamer.

For this purpose, a total sample of 108 gamers were taken through a survey method which consisted of 52 male, 51 female, 2 non binary. The participants were asked questions about the choice of the gameplay and intentions behind playing the game. An experiment was also conducted to measure the impact of rewards on a gamers behavior.

Keywords: surveillance, surveillance capitalism, gamification, gamified surveillance, control, rewards, data collection, privacy, internet gamification

Introduction

The desire of humans to get more than what is existent has been evident from the beginning of existence. In order to progress and evolve it is believed to be mandatory to develop and invent more than what already exists. This want for more has led to many interventions in society.

In 1927, Edward Bernays (nephew of Sigmund Freud) used the psychoanalytic theory coined by Sigmund Freud to target the audience's subconscious and played with the slogans of advertising in order to bring profits to the company.

Similar scenarios are seen being played in the 21st century- the era of the internet. Although today, to get to know the audience's subconscious is fairly easier because almost everyone uses the internet today. Getting an audience's digital footprint is easier due to the practice of surveillance by the big giants in the industry. The question that arises here is how is data valued as in the systems of the internet, the government, big giants?

The rise in technology and the internet has led to digitisation of the physical world we live in. The layered digitized society today has not been able to yet close the loopholes of privacy breaches, hacking, surveillance. The definition of surveillance today has expanded its boundaries and areas from just being able to track and collect user data. Many scholars and surveillance researchers have identified various definitions.

Shoshana Zuboff introduced the term surveillance capitalism which declares human experiences as raw materials to generate behavioral data.(Shoshana Zuboff, 2018).

With AR, VR increasing the data surveillance technology is beyond two dimensional spaces today. Data collection is the process of tracking progress of the user navigation on the internet where the users are given a sense of control who then gets provided with the rewards of curated feeds, advertises, curated search results, etc. which again gives a sense of control to the user, Although, while this happens in the front end of the system the big giants get the monetary benefits in exchange of data selling.
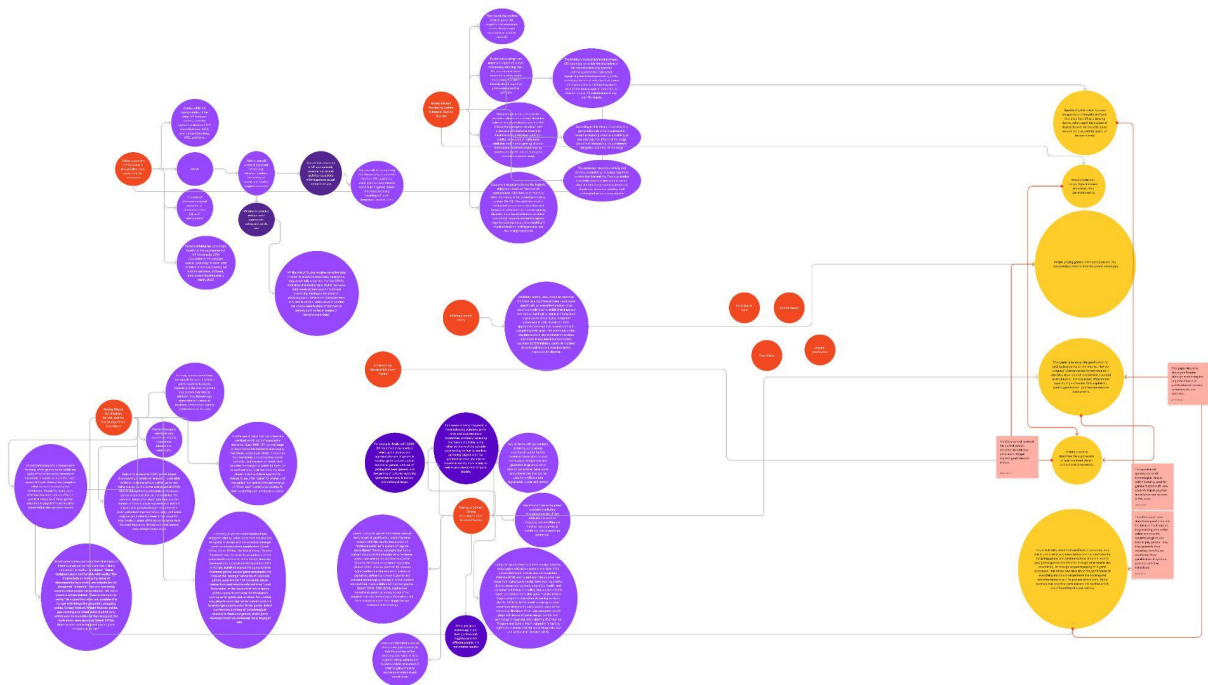
Literature Review

Fig.1 Visual representation of literature survey

According to Cambridge Dictionary, surveillance is defined as a careful watching of a person or a place by officials of the state.

Surveillance on the internet and digital spaces takes quite a different form. As the term coined by Shoshana Zuboff, "surveillance capitalism" is the state of tracking personal data of internet users to convert it into behavioral data. While some of this data is used by the businesses for business/ product improvement, the rest of the data acts as an input to machine intelligence to anticipate the user's next move on the internet. These prediction products are exchanged into markets for behavioral predictions. Surveillance capitalists generate massive monetary benefits from such exchanges of behavioral data. (Zuboff, 2018). Surveillance capitalism is omnipresent.

It is not accidental or misuse of corporate power, but an intentional move in working of systems. (Doctorow, 2021).

As the world wide web transfers its reaches from two dimensional spaces of the internet to larger frameworks of three dimensional operations such as virtual reality, bluetooth connectivity, artificial intelligence and chatbots, surveillance has also gained its power from a two dimensional being to three dimensional spaces of practicing tracking of physical spaces. Virtual reality technology can track data related to physical experience of the use. With VR's built in sensors and cameras, devices such as Oculus can register data related to body movements and can capture spatial data. Given the embodied nature of VR technology it majorly relies on getting data related to the user's body. Virtual reality technologies have reached a level where it can also determine the user's dominant hand. Oculus, a VR technology led company which manufactures VR headsets, currently owns 61% share over its other competitors (Marcus, 2021). Various sectors of the industry, education, work, army, etc have incorporated VR technologies as a part of training and learning. VR headsets and VR technology is famously known for its foundation in the game industry. From the various domains helping in generation of data points, education, work, training, etc, our interactions and progress on these platforms are surveilled and rewards are meted out (Benjamin, 2019). While we willingly give consent to our progress getting tracked online to generate data related to our behavior and preferences which then gets traded into markets, it describes much more than just getting monetary benefits, it is a description of power and control (Benjamin, 2019). Gaining power and control can be seen in both of the stakeholders of this gamified system of surveillance in order to generate data points. Users get control over their digital experiences and the corporations get power and control over the data of users. Gamification can also be seen in Netflix, a new genre of interactive series where watchers get control over how the story progresses ahead, similar to fantasy and storybook games.

Boellstroff identifies three levels of game study approaches gaming culture, cultures of gaming, and gaming of cultures (applying gaming mechanisms into the society at large). This constant illusions of control and repetitive choices, essentialised sociotechnical norms, insignificant game rules, is evident how lives are getting played with in a trend driven society (Benjamin, 2019). Immersive experiences in games, rewards, levels and challenges lead people to getting hooked onto playing video games. Getting control over the virtual self while things in the real world are usually not in a person's hand leads to instant gratification.

Instant Gratification:

Instant gratification is referred to as immediate pleasure gained after satisfying immediate craving to do a certain thing without measuring its long term effect. It is observed that usually gamers choose to play and replay a particular game in search of instant gratification and control.

Rewards and Control:

Rewards are a byproduct of this process. For addiction, reward processing systems are regarded as the key neural mechanism involved in processing human cognitive and behavioral processes. Hindering the rewards system is one of the core symptoms that lead to neurological diseases (Weiss, 2001). Reward processing can be divided into two sub segments (i) Reward anticipation (ii) Outcome evaluation. Reward anticipation "refers to the incentive salience of a reward. Incentive salience is a psychological process that imbues the perception of stimuli with salience and transforms them into incentive stimuli. Previous addiction studies conducted on substance addiction and internet gaming disorder indicated altered reward processing systems among the addicts during the reward anticipation stage. They found less activations in ventral striatum and decreased prefrontal cortical sensitivity to monetary rewards " (Zhong, 2020). Outcome evaluation refers to sensual pleasure received from reward consumption. The addiction studies have found out that internet gaming disorder and users who are addicted to reward processing systems tend to ignore negative consequences of any situation and thus are prone to taking more risky decisions than a person who is not an internet game user. Internet gaming users are also highly sensitive towards high score reward indicators as well as less sensitive towards deprivation (Zhong, 2020).

Flow Theory

Flow theory was presented by Csikszentmihalyi who observed artists while painting and noticed their complete immersion into the process. However, as soon as the painting was complete, the artists' used to lose interest. Through interviews Csikszentmihalyi asked why certain people enjoyed doing one particular task while others resented the same task.

That is how the theory of Flow was coined. When individuals are performing an activity which uses the peak of their ability, they experience a state of satisfaction and content and it is in this level that they experience "concentration, immersion and a sense of control"(Csikszentmihalyi, 1990)
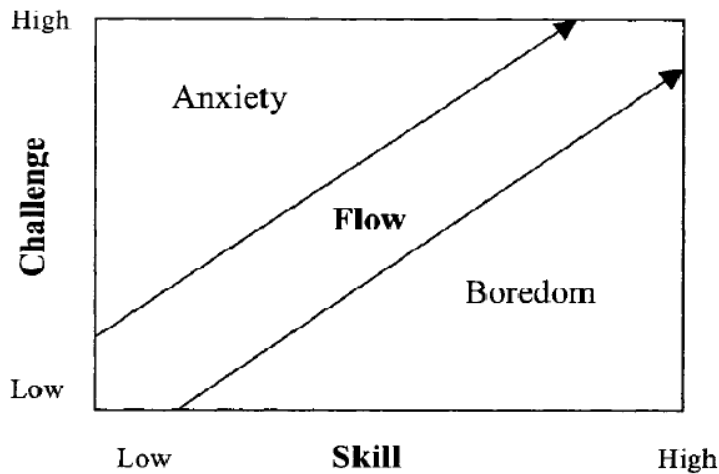
Fig.2 Flow Theory by Mihaly Csikszentmihalyi

Objective

Studies have suggested the psychology of control hampers a player's cognitive system. Power and control are the factors that affect the surveillance system.

Control, immersive experiences and tracking of data are factors contributing to addictive behaviors of users, unethical practices and lack of transparency, but how much does the reward system contribute to getting a user hooked on to a digital system?

The studies have looked at gamified surveillance, control and addiction as separate entities, this study tries to look at all of these factors as one while also probing into the reward system and their impact of manipulating a players mindsets and keeping them hooked to a game.

Hypothesis

(i) Negative or positive score boards displayed in the game have an impact on cognitive behavior. Rewards and incentives are the major contributors to getting hooked on a gamified platform.

(ii) On a conscious level, rewards might not be directly affecting the user to play. Major contributors for flow, might be immersive experiences and gaining control.

Research Methodology

Survey

A survey was constructed to understand the underlying reasons behind choice of a particular game for a gamer. Understand the intent behind playing a particular game. In order to map out the impact of reward system and intention behind gaming a set of variables were constructed:

I. **Gender**

II. **Age**

III. **Hours of gameplay**

IV. **Type of games played**

V. **Metrics describing aspect of gameplay that the player enjoyed the most:** Rewards, levels and challenges, immersive experiences, control, excitement and adrenaline rush

VI. **Intention behind playing:**

Sense of control	A sense of control over a tiring day, a sense of control on the game play and the player, feeling of in charge, creation of other world
Enjoyment/ Entertainer	Stress buster
Usefulness	Player consciously plays game with an intent that it will help increase productivity and performance in other activities
Norms	Societal pressure, peer pressure, socializing
Flow	Getting immersed in gameplay which might lead to shut off surrounding environments
Satisfaction	Positive feeling when virtual experiences meet the real experiences

Experiment

This experiment is conducted in an uncontrolled scenario. The objective of this experiment was to measure how rewards(score points) along with control affect the player's cognitive system to make them hooked onto the gameplay. The experiment recorded:

(i) The total amount of time played by each player

(ii) The number of times the player has played/ re-played the game

(iii) Score of each game session

The game is an infinite loop game where the player has to avoid the hurdles represented as rocks(where the player dies) and also some hurdles where the player gets negative points. The players have to manage to collect all the positive points. As the player moves ahead with the game, the speed at which the game is operating increases as opposed to the amount of time the player has played the game. This equation is based on a reverse exponential graph. After a certain point in time the speed stops increasing but the player can still play the game. These aspects are added to increase the level of difficulty in the game and to measure in spite of these difficulties, how many times the player plays the game.

Survey:

Participants

There were 107 participants, 53 identified as male (49.1%), 50 identified as female (47.2%), 2 identified as non binary (1.9%), and 1 response recorded as gender not specified. The age groups were divided into 10 years of age 15 to 25, 26 to 35, 36 to 45, 46 to 55, 56 to 65, 66 to 75, 76 to 85. The survey recorded responses from participants from age group 15 to 65. Most of the response was recorded from the age group 15 to 25 (80.4%) followed by 26 to 35 (8.4%).

Limitations

The participants were approached at random through social media platforms. A google form link was sent through apps like Discord, Reddit, Instagram, and Whatsapp. The survey had one limitation that the person answering should be engaging in some sort of gameplay.

Variable

Dependant Variables:

Gameplay genre

Intention behind playing

Independent Variables:

Hours

Age

Gender

Findings

The data collected through the survey showed participants and game players are more engaged in gaming (Fig 4) by the immersive experiences(40) followed by excitement and adrenaline rush(38), then levels and challenges(36). Participants tend to gain more excitement and enjoyment from playing games(96) followed by a feeling of satisfaction(58) and then gaining a sense of control(38) (Fig 3).
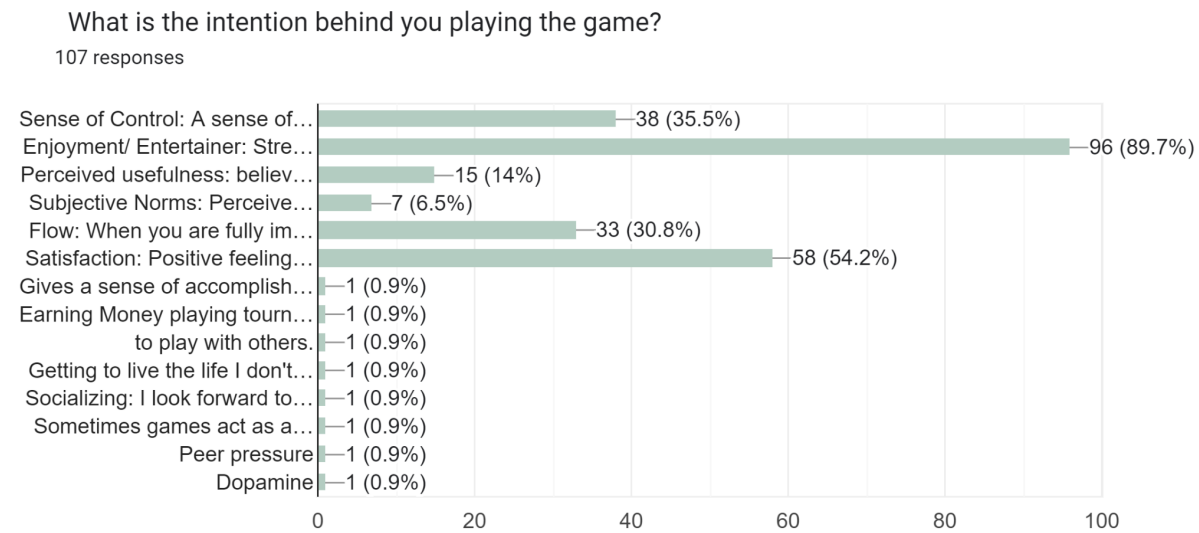
What is the intention behind you playing the game?
107 responses

Fig.3 Metrics describing intention behind playing. Dominated by the intent of enjoyment/ entertainer checked by 96 game players (89.7%)

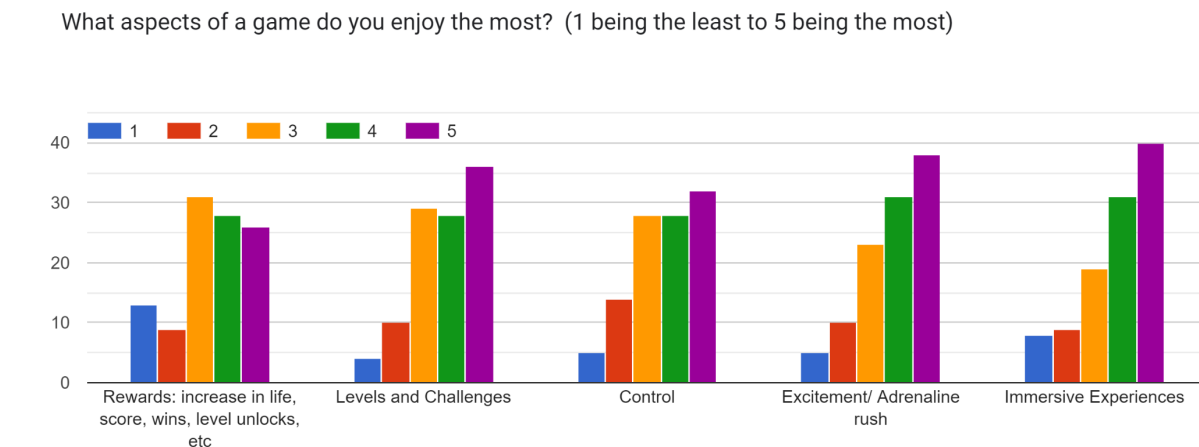What aspects of a game do you enjoy the most? (1 being the least to 5 being the most)

Fig. 4 Aspects of games that players enjoy the most.

Experiment

The game was a simple "endless runner" game. The development of this game was divided into three phases:

Phase 1 - Gameplay

The basic version of gameplay was created by using basic shapes as a placeholder.

p5.js was used as the basic graphic framework. p5.js is a JavaScript library that is designed for creating graphics and animations. It is built on top of the HTML5 canvas element, which provides a 2D drawing surface. With p5.js, one can easily create 2D games by manipulating the canvas element with JavaScript. Some of the benefits of using p5.js as a 2D game engine include:

   I.   Cross-platform compatibility: p5.js is built on top of web technologies, so it can be used on any device that supports modern web browsers.

  II.   Built-in support for graphics and animations: p5.js includes a wide range of built-in functions for creating shapes, drawing images, and animating objects.

 III.   Open-source and community-driven: p5.js is an open-source project with a large and active community of developers. This means that there are many resources available for debugging and troubleshooting.

Phase 2 - Graphics

Once the basic gameplay was completed, all the placeholder shapes were replaced with png images. The background was created using Canva Ai image builder and the planets, asteroids and rocket were downloaded from Freepik Icon Downloader. UI screens and font files were also implemented into the game. This version included a score and time indicator as well.
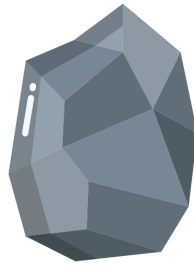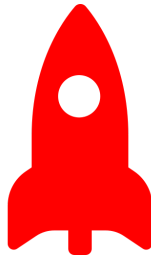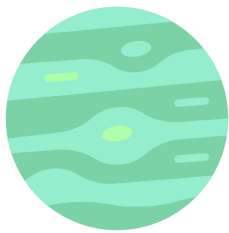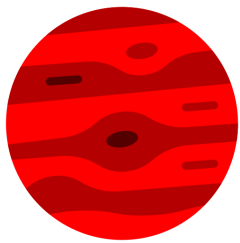
Phase 3 - Database Integration and Optimization

FireBase was used for the database functions. It is a mobile and web application development platform that provides various tools and services for building and managing cloud-based applications. It includes features such as a real-time database, authentication, hosting and storage. Firebase can be a great option for storing data from users in a p5.js game because:

I.   Real-time updates: Firebase offers real-time updates, which means that any changes made to the data in the database are automatically updated in real-time, without the need for the user to refresh the page.

II.   Scalability: Firebase is a highly scalable platform, which means that it can handle large amounts of data and high levels of traffic without any issues.

III.   Security: Firebase provides strong security features, including secure authentication and data encryption, which can help ensure that user data is kept safe and secure.

IV.   Cross-platform compatibility: Firebase is compatible with a wide range of platforms, including the web, iOS, and Android, which means that we can generate responses from different devices

Database format:

FireBase employs a non-relational database. The data generated from the game is stored in the following format:

Users
 |__ User1
     |__ Total Time Played
     |__ Total Games Played
     |__ Sessions
         |__Game1
             |__ Score
             |__ Time Survived
         |__Game2
             |__ Score
             |__ Time Survived
 |__ User2
     |__ Total Time Played
     |__ Total Games Played
     |__ Sessions

```
|__Game1
     |__ Score
     |__ Time Survived
|__Game2
     |__ Score
     |__ Time Survived
```

Once the database other optimizations such as implementing a progressively increasing speed, capped at a certain level, were set. Netlify was used to host the application.

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