الجمهورية الجزائرية الديمقراطية الشعبية
Ministry of Higher Education and Scientific Research
وزارة التعليم العالي والبحث العلمي
People's Democratic Republic of Algeria

HIGHER SCHOOL OF MANAGEMENT AND DIGITAL ECONOMY

المدرسة العليا للتسيير والاقتصاد الرقمي

Dissertation submitted in partial fulfilment of the requirement for a master's degree

Major: E-Business

SUBJECT:

Impact of Gamified system on user engagement

CASE: HEETCH EL DJAZAYER.

Submitted By:
Mme. RAHLAOUI Feriel

Supervisor:
Dr. KOUADRI Norhene

Class B lecturer

4th Promotion

Academic year
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Dedication:

To the fire inside me,

To the silent battles, the late-night tears, and the mornings I rose anyway.

To the version of me who kept going when giving up felt easier, this is your triumph.

To my father,
Who now lives among the stars. You didn't get to see this day, but I felt you in every heartbeat, in every tear I held back. This is for you, I hope you're proud.

To my mother,
The soul who stitched my wounds with her love. You carried me when I couldn't stand, believed when I stopped believing. You are the breath behind this dream.

To my little brother,
In your eyes, I see echoes of him, the strength of our father in your laugh, his gentleness in your heart. Though you never got to meet him, you carry his light in ways I cannot explain. You are my reminder that love never truly leaves us.

To my man, my hero,
In the shadows of my worst days, you stood unshaken. You lifted my chin when my eyes couldn't bear to look forward. Thank you for being my storm shelter, my calm sea. You are written into every page of this success.

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To my family
Walida, Aziz, Mazen, My Grandmother, My Maternal Aunts, Their Daughters, My Uncles Rachid and Salim.
Your love is the foundation on which I built this journey. Thank you for every word, every hug, every silent prayer.

To Roula and Hadil,

The girls who knew me before the world did. Our childhood still echoes in my heart, thank you for keeping my roots alive.

To my soul-circle

Roufaida, Nihad, Rim, Assala, Malak, Ritadj, kamelia, Celia, Nihad, Hadjer, Almaz, Amel. More than friends, you were the music when things went silent, the fire when things went cold. I didn't walk this road alone because you were there, walking beside me with laughter and love.

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Acronyme	Signification
B2B	Business-to-Business
B2C	Business-to-Consumer
CATI	Computer Assisted Telephone Interviewing
CEO	Chief Executive Officer
CHI	Computer-Human Interaction
CRM	Customer Relationship Management
GDPR	General Data Protection Regulation
IDI	In-Depth Interviewing
IR	Information Retrieval
IVR	Interactive Voice Response
LIS	Library and Information Science
MOOCs	Massive Open Online Courses
PANAS	Positive and Negative Affect Scale
SDT	Self-Determination Theory
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
UCaaS	Unified Communications as a Service
UE	User Engagement
VTC	Tourist Vehicle with Driver

Abstract

This study investigates the impact of gamified systems on user engagement within the context of Heetch's ride- hailing Application. Drawing on a comprehensive theoretical review, covering core gamification concepts, instruments, and the multidimensional nature of engagement.

the research employs a mixed- methods approach. The applied phase involved telephone interviews with 494 Heetch drivers, complemented by univariate and bivariate statistical analyses. Drivers rated their agreement with statements concerning ranking and rewards, notifications, bonus- on- recharge, and in- app challenges, then identified their primary motivators. Univariate results examining individual variables collected from the survey. while bivariate tests confirm that perceiving bonuses as structuring one's day is significantly associated with selecting financial rewards , higher agreement on the usefulness of notifications correlates with greater personal satisfaction from goals and rewards and drivers who view the bonus on recharge feature as encouraging continued use are more likely to choose it as their primary motivator. These findings suggest that integrating clear reward structures and immediate financial incentives can substantially enhance driver engagement. The study concludes with recommendations for iterative gamification design, emphasizing variety, personalization, and continuous measurement, to foster sustained engagement and satisfaction among ride- hailing drivers.

Key-words: gamification, user engagement, bivariate analysis, univariate analysis, bonus-on- recharge

Résumé

Cette étude examine l'impact des systèmes gamifiés sur l'engagement des utilisateurs dans le contexte de l'application de VTC Heetch. S'appuyant sur une revue théorique exhaustive, couvrant les concepts fondamentaux de la gamification, les instruments et la nature multidimensionnelle de l'engagement.

la recherche adopte une démarche méthodologique mixte. La phase appliquée a consisté en des entretiens téléphoniques avec 494 conducteurs Heetch, complétés par des analyses statistiques univariées et bivariées. Les conducteurs ont évalué leur niveau d'accord avec des affirmations concernant le classement et les récompenses, les notifications, le bonus à la recharge et les défis intégrés à l'application, puis ont identifié leurs principaux moteurs de motivation. Les résultats univariés examinent les variables individuelles recueillies par l'enquête, tandis que les tests bivariés confirment que la perception des bonus comme structurant la journée est significativement associée au choix des récompenses financières, qu'un accord plus élevé sur l'utilité des notifications corrèle avec une plus grande satisfaction personnelle vis-à-vis des objectifs et des récompenses, et que les conducteurs percevant la fonction de bonus à la recharge comme incitative à la poursuite de l'utilisation sont plus susceptibles de la choisir comme motivation principale. Ces conclusions suggèrent que l'intégration de structures de récompenses claires et d'incitations financières immédiates peut considérablement améliorer l'engagement des conducteurs. L'étude se conclut par des recommandations pour un design itératif de la gamification, mettant l'accent sur la variété, la personnalisation et la mesure continue, afin de favoriser un engagement et une satisfaction durables parmi les conducteurs de VTC.

Mots-clés : gamification, engagement des utilisateurs, analyse bivariée, analyse univariée, bonus à la recharge

ملخص

تهدف هذه الدراسة إلى استكشاف تأثير الأنظمة المعتمدة على مبادئ اللعب على تفاعل المستخدمين ضمن سياق تطبيق هيتش لخدمات النقل التشاركي. بالاعتماد على مراجعة نظرية شاملة تغطي مفاهيم اللعب الأساسية والأدوات والطبيعة متعددة الأبعاد للتفاعل.

تتبنى هذه الدراسة منهجية مختلطة. تضمنت المرحلة التطبيقية مقابلات هاتفية مع 494 سائقًا لدى هيتش, و ارفقت بتحليلات إحصائية أحادية البُعد ومتغايرة البُعد. قيّم السائقون مدى توافقهم مع عبارات تتعلق بالتصنيف والمكافآت والإشعارات ومكافأة الشحن والتحديات داخل التطبيق، ثم حددوا محفزاتهم الرئيسية. تستعرض النتائج الأحادية المتغيرات الفردية التي جُمعت من الاستبيان، بينما تؤكد الاختبارات ثنائية المتغير أن اعتبار المكافآت كعنصر ينظم اليوم مرتبط بشكل كبير باختيار المكافآت المالية، وأن الاتفاق الأعلى على فائدة الإشعارات يرتبط بمستوى أعلى من الرضا الشخصي عن الأهداف والمكافآت، وأن السائقين الذين يرون ميزة مكافأة الشحن كحافز للاستمرار في استخدام التطبيق هم أكثر ميلاً لاختيارها كمصدر دافع رئيسي. توضح هذه النتائج أن دمج هياكل مكافآت واضحة وحوافز مالية فورية يمكن أن يعزز بشكل كبير من تفاعل السائقين. تختتم الدراسة بتوصيات لتصميم متكرر للأنظمة المعتمدة على اللعب، مع التركيز على التنوع والتخصيص والقياس المستمر، بهدف تعزيز التفاعل والرضا الدائمين بين سائقي خدمات النقل التشاركي.

الكلمات المفتاحية: الألعابية، تفاعل المستخدمين، التحليل الثنائي المتغير، التحليل الأحادي المتغير، مكافأة الشحن

General Introduction

General Introduction

In today's world, people are naturally drawn to creativity and exploration two powerful drives that modern technology continues to nourish through immersive and interactive digital experiences. At the heart of this evolution lies gamification, a strategic approach that integrates game-like elements into non-game environments in order to make them more engaging and rewarding. By transforming routine tasks into playful challenges, gamification captures users attention and fosters deeper emotional and cognitive involvement.

In the broader context of user engagement, gamification has emerged as a revolutionary method, now widely adopted across sectors like education, marketing, health, and mobile app development. Its goal is to encourage active participation and guide user behavior by creating experiences that feel both interactive and meaningful. Engagement is no longer seen as a simple metric of use, it's about the quality of the interaction, the motivation to return, and the sense of satisfaction that keeps users committed over time.

Gamification leverages psychological principles such as reward, competition, and achievement to stimulate user involvement, while engagement reflects the emotional, cognitive, and behavioral investment users make in a system. When combined effectively, gamification can transform passive users into active participants, fostering loyalty, satisfaction, and sustained interaction. However, the effectiveness of gamification is not universal, it depends on the context, the design of the system, and the needs and motivations of the users involved. Understanding how these two concepts interact is essential for creating digital experiences that are not only functional, but also genuinely compelling.

This master's dissertation aims to explore in depth the impact of gamification on user engagement. It will focus specifically on how gamified elements are used within professional mobile applications more precisely, Heetch's VTC app for drivers, and how these features influence motivation, satisfaction, and continued use. The study will analyze the relationships between key dimensions of gamification and how these influence the overall user experience.

The choice of this topic was motivated by several factors. On a personal level, We have always been interested in what drives people to stay engaged, especially in digital environments. Gamification offers a fascinating lens through which to study these behaviors. Professionally, the topic feels highly relevant, especially in contexts like ride-hailing platforms where user retention is crucial, yet often taken for granted. In particular, in regions like Algeria, where

digital transformation is still evolving, understanding how to apply these techniques effectively could offer new opportunities for both users and companies.

This research was guided by the following central research question: **"For Heetch's VTC aplication, to what extent do different gamification elements influence driver engagement?"**

To delve deeper into this overarching theme, several sub-questions will be addressed:

1. How is the behavioral dimension related to the financial dimension
2. To what extent does the cognitive dimension relate to the emotional dimension ?
3. How does the accessibility dimension influence the preferred gamification strategy selected by the driver?

In order to explore the problem and sub-questions in depth, I have formulated several hypotheses grounded in both the literature and preliminary observations.

Hypothese1: "Drivers who agree that bonuses help them structure the day are more likely to declare financial bonuses their main motivation."

Hypothese2: "A higher level of agreement on the usefulness of notifications is associated with a higher level of personal satisfaction from goals and reward"

Hypothese3: "Perceiving the recharge system as encouraging continued use increases the odds that the driver selects "bonus on recharge" as the most motivating strategy"

The structure of this master's dissertation is divided into two main chapters. The first chapter is theoretical in nature and presents the foundational concepts of the study. It includes a detailed exploration of the core principles of gamification, an analysis of key gamification tools and their associated challenges, as well as an overview of user engagement (UE) and its relationship with gamification. The second chapter focuses on the practical component of the research and includes the empirical study. The first section presents the host organization, HEETCH, highlighting its relevance and connection to this study. The second section outlines the research methodology describing the approaches and techniques applied, and presents the results of both the univariate and bivariate analyses.

To support the empirical component of this study, telephone interviews were conducted with the entire population of 2,000 Heetch drivers and a sample of 494, based on contact information kindly provided by the company. This process required considerable time and organization, as it involved reaching out to a diverse range of drivers to collect meaningful insights into their day-to-day use of the app's gamified features. These interviews offered both quantitative and qualitative perspectives on drivers behaviors, motivations, and perceptions. Based on the responses gathered, both univariate and bivariate statistical analyses were performed. The univariate analysis, carried out using XLSTAT, provided a descriptive overview of the data. The bivariate analysis, performed with XLSTAT, allowed for the identification and interpretation of correlations and associations between key variables related to user engagement and the use of gamified systems. The statistical analysis revealed a margin of error of approximately 4%, which is considered very significant for the purposes of this study and supports the reliability of the results within the selected sample.

To develop a deeper understanding of how gamification influences user engagement, this study drew on both theoretical foundations and recent academic research. The book by Mike Hyzy, Bret Wardle, and Gabe Zichermann, *'Gamification for Product Excellence'*, provided the core definition and historical background of gamification, helping to situate the concept within a broader technological and behavioral context. In addition, the studies by Feng et al. (2023) and Toda et al. (2019) offered detailed frameworks for identifying and analyzing various dimensions of gamification, including measurement, social, and ecological aspects.

Since Heetch does not explicitly define or organize its gamification features using such dimensions, it became necessary to adapt and reinterpret them to fit the specific context of this research. Building on these frameworks, we developed an analytical model that categorizes Heetch's gamified elements (such as bonuses and reward systems) into broader dimensions like behavioral, emotional, cognitive, social, and accessibility-related . This innovative approach made it possible to analyze the drivers experiences more precisely and to investigate how different types of gamified features influence their engagement. By proposing and applying this tailored framework within a ride-hailing context, this master's dissertation itself constitutes a novel contribution, offering a replicable tool for both researchers and practitioners to evaluate and compare gamification strategies in mobility services.

Chapter I: Theoretical Underpinnings of Gamification

Chapter I: Theoretical Underpinnings of Gamification

Introduction

The rapid evolution of digital technologies has positioned gamification as a transformative strategy across industries, leveraging game design principles to enhance user engagement and motivation. Rooted in psychological and pedagogical theories, gamification transforms mundane tasks into engaging experiences by appealing to intrinsic human desires for achievement, competition, and social interaction. This chapter explores the theoretical foundations of gamification, its core components, and its interplay with user engagement. Beginning with definitions and historical contexts, it examines application fields ranging from education to Corporate Environments, while addressing the diverse audiences and theories Behind Gamification such as Self-Determination Theory (SDT) and Flow Theory that underpin its efficacy. The chapter further dissects gamification instruments, implementation tools, and challenges, including ethical and design limitations, before culminating in an analysis of user engagement metrics and how gamification strategies amplify participation and retention. By bridging theory and practice, this chapter establishes a foundation for understanding how gamified systems, like those implemented at Heetch, drive meaningful user interactions.

Section 01: Core Concepts of Gamification

This section establishes the foundational understanding of gamification by exploring its definition, historical evolution, and diverse applications. Beginning with its origins in behavioral psychology and digital innovation, it examines how gamification transcends industries, from education to marketing, while emphasizing the importance of aligning game mechanics with audience preferences. The discussion is anchored in theoretical frameworks like Self-Determination Theory (SDT), which explains how autonomy and mastery drive engagement.

1.1. Definition and History of Gamification

This section opens by defining gamification as the use of game-design elements (e.g., points, badges, leaderboards) in non-game contexts to enhance engagement, then traces its evolution from early 1900s reward management programs through mid-century teaching machines like Gordon Pask's SAKI to Nick Pelling's coining of "gamification" in 2002 and its widespread uptake by 2010.

1.1.1. Definition of gamification

Gamification, as presented by Hyzy Mike, Wardle, and Zichermann, really struck a chord: "*Gamification is a process that involves adding game-like elements and psychology to traditionally non-game activities or products in order to increase engagement, motivation, enjoyment, and fun*."[1]

Werbach & Hunter's definition is quite similar to that of Deterding et al. It sounds as follows: "*The use of game elements and game-design techniques in non-game contexts*". This definition works with a different concept of game elements and separates game-design techniques from game elements in order to emphasize that successful gamification is more complex than applying a few elements.[2]

[1] Hyzy Mike, Wardle Bret, Zichermann Gabe (2023), *"Gamification for Product Excellence":* Make Your Product Stand Out with Higher User Engagement, Retention, and Innovation, Packt Publishing, Birmingham, p.3.
[2] Ludus.hu, *« The Definitions of Gamification* », https://ludus.hu/en/gamification/, [last consultation 09/03/2025, 22:32].

1.1.2. History of Gamification

Gamification, though a modern buzzword, has roots stretching back several decades. Its evolution reflects the growing recognition of game mechanics as powerful tools for motivation, engagement, and behavior change. From early ideas about using games to boost workplace productivity in the 1970s to its widespread adoption across industries and everyday apps in the 2010s, the journey of gamification shows how deeply game-inspired design has shaped user experience in both business and daily life.

- ✓ **1973 -The power of games to engage employees is recognised**

"Released in 1973, the game of work was written by Charles A Coonradt to address the issue of flagging productivity in the US. Noticing that productivity was failing as sales of recreation and sports equipment was rising, Coonradt suggested that fun-and-games might be the answer to the thorny problem of employee engagement."

- ✓ **1981-Gamification takes to the skies**

"American Airlines releases AAdvantage, the world's first frequent flier programme. The initiative sought to encourage customer loyalty by offering rewards for frequent patronage, a model we still see today in every high-street coffee shop."

- ➢ **The 2000s**

- ✓ **2002-Gamification is born**

"While designing a game-like user interface for commercial electronic devices (ATMs, vending machines, mobile phones) Nick Pelling coins the 'deliberately ugly' word, gamification. With a name in place, the history of gamification truly begins."

- ✓ **2005-The First Modern Gamification Platform** *"Rajat Paharia founded Bunchball, a platform designed to boost engagement on websites by adding a layer of game mechanics. It would be another 3 years before they adopt the term 'gamification'."* [1]

[1] Hary cloke,August 29,2019, *THE HISTORY OF GAMIFICATION (FROM THE VERY BEGINNING TO NOW)*, The History of Gamification: From the Beginning to Right Now (growthengineering.co.uk)

- ✓ **2008-Gamification goes on record**

"In a blog article covering his time at the 2008 Social Gaming Summit, Bret Terrill is documented as using the term 'gamification' for the first time: "In conversations, one of the biggest topics … is the gamification of the web. The basic idea is taking game mechanics and applying to other web properties to increase engagement."

- **The 2010s**

- ✓ **2011- Gamification Explodes**

"Gamification Co. host the inaugural Gsummit in San Francisco attracting around 400 attendees (a number that would double by 2014). Jane McGonigal's game-changer, Reality is Broken is officially released at the summit.

A workshop entitled "Gamification: Using Game Design Elements in Non-Gaming Contexts" is held at the CHI (Computer-Human Interaction) 2011 conference, spawning the Gamification Research Network."

- ✓ **2016-Gamification Goes Viral (and No One Realises)**

"Pokémon Go is one of the most successful applications of gamification with over 800 million downloads. People who would normally turn their nose up at badge collection were out patrolling the streets searching for rare Pokémon. As a result, Pokémon Go is one of the most successful apps of all time."

- ✓ **2017-Gamification Advocates Meet Up**

"This was the year that Gamification Europe arrived on the scene. For the first time, hundreds of passionate gamification advocates were coming together to share ideas and strategies.

Furthermore, the World Government Summit put together a strategy for applying gamification in education. These two events mark the beginnings of game mechanics being applied more broadly. As a result, 2017 could be seen as the year that gamification goes from

being a novel concept to a tool that designers across the world are using, without even realising it."

- ✓ **2018-Gamification Everywhere**

"By 2018, nearly all apps include gamification in some way. Gamification is no longer just found on language learning and exercise apps, but meditation, to-do lists, job applications, litter picking, wildlife spotting, tea collecting… you name it there's a gamified app for it.

It's much harder to spot gamification these days. Not because there's less of it but because there's just so darn much of it. In fact, gamification is everywhere."[1]

1.1. The different Application Fields of Gamification

Gamification is no longer confined to a single domain; it now spans a wide range of fields. This section explores the main application areas of gamification, highlighting how its mechanisms are used to enhance user experience, boost motivation, and encourage engagement.

1.1.1. Learning and Development

Gamification techniques can be effectively integrated into educational settings to foster student engagement, promote autonomy, and support academic achievement. In a study conducted by Carla Wilson on enhancing student engagement through gamification, a gamified learning environment was developed using a series of quests embedded within a cohesive narrative.

This initiative applied practical educational strategies, resulting in positive feedback from participants who reported increased engagement. The findings suggest that gamification holds promise as a strategic approach in the fields of learning and development. The study employed a blended learning model that combined online elements with face-to-face instruction. The enjoyable, playful, and entertaining aspects of gamification were found to stimulate engagement and encourage learners to interact more readily with enriched content. While gamification fosters motivation, it is essential to integrate sound pedagogical principles alongside playful elements to sustain learner interest. Tools such as quests, mystery narratives,

[1] Ibid

and interactive game labs were employed to drive student motivation. Framing educational activities as games may therefore serve as a powerful tool for increasing engagement. As noted by Deterding et al., this involves the structural integration of game-based practices and elements into non-game contexts to enhance student motivation and learning outcomes.[1].

1.1.2. Health and wellness

Health and wellness applications increasingly incorporate gamification to encourage individuals to adopt and maintain healthier lifestyles. Platforms such as Fitbit, MyFitnessPal, and other Internet of Things (IoT)-based applications utilize game elements to monitor physical activity, establish personalized goals, and reward users upon reaching specific milestones. This gamified approach serves to enhance user motivation, promoting sustained physical activity and healthier behavioral choices.[2]

1.1.3. Marketing and Customer Loyalty

Gamification is widely employed in marketing and customer loyalty programs to stimulate active participation and foster brand engagement. Organizations frequently implement reward systems that allow customers to accumulate points or badges by making purchases, sharing content, or interacting with the brand in various ways. A notable example is the Starbucks Rewards program, which grants points for each transaction, redeemable for complimentary products. Additionally, interactive campaigns, such as contests and scavenger hunts leverage gamified elements to increase user involvement.

These strategies not only enhance the overall customer experience but also cultivate a stronger emotional connection with the brand by making interactions more enjoyable and intrinsically rewarding. [3]

1.1.4. Human Resources

Gamification can be effectively applied in the field of recruitment, transforming traditional hiring strategies into experiences that are engaging, playful, and innovative. By incorporating

[1]Prasad, K. D. V., "*Gamification and Its Applications",* Journal of Business Strategy Finance and Management, Vol. 3 (1–2), 2021, pp. 04–07, DOI : http://dx.doi.org/10.12944/JBSFM.03.01-02.02
[2] Alexander S. Gillis et Nick Barney, "*What is Gamification? How It Works and How to Use It* "| Definition from TechTarget, TechTarget (updated February 2025), https://www.techtarget.com/searchhrsoftware/definition/gamification, [Last consultation 13/03/2025, 02:03]
[3] Brian Flores, op.cit.

game elements into the recruitment process, candidates become more immersed, allowing for a more comprehensive assessment of their skills and potential. This approach offers an alternative to conventional, often repetitive, recruitment methods by placing candidates in dynamic, game-like scenarios that stimulate creative and analytical thinking. For instance, Google's *Code Jam* challenges participants to solve complex algorithmic problems using programming languages such as C++ and JavaScript. This format is both entertaining and intellectually stimulating, helping to identify and attract top programming talent. Another example is Domino's *Pizza Mogul*, a gamified platform that allows customers to design their own pizzas and earn rewards. In some cases, engaged users may even emerge as potential job candidates. These gamified recruitment initiatives reflect a blend of innovation, creativity, and user engagement, enhancing the overall talent acquisition process.[1]

1.1.5. Corporate Environments

In corporate environments, gamification has been shown to enhance employee engagement and improve overall productivity. Organizations may implement performance-tracking systems that incorporate elements such as badges, points, and leaderboards to recognize achievements and encourage friendly competition. For instance, Salesforce utilizes gamified sales performance dashboards that enable employees to visualize their progress and remain motivated through a competitive yet collaborative environment. Additionally, team-building activities can be gamified to strengthen collaboration and boost workplace morale. By increasing the engagement level of routine tasks and offering incentives tied to performance goals, companies can effectively elevate employee motivation and operational outcomes. Furthermore, the integration of gamification within Unified Communications as a Service (UCaaS) platforms can significantly improve user engagement and communication efficiency. By embedding game-like elements, such as leaderboards and achievement badges into tools like VoIP and video conferencing, UCaaS systems become more interactive and stimulating. This approach not only fosters higher usage rates but also contributes to a more dynamic and motivated work culture.[2]

[1] KDV PRASAD,op cit *P6*
[2] *Brian Flores, op.cit.*

1.2. The Audience of Gamification

In 1996, Dr Richard Bartle, a British professor and game researcher had published a paper titled "Hearts, Clubs, Diamonds, Spades: Players Who Suit MUDS". A report on Dr Bartle's findings while researching different types of video game players especially players of multiplayer online games. What was birthed from his study is a widely used classing system that helps game developers build and fix their game structure around the specific player types the developers hope to attract, for games both big and small.

What is now referred to as The Bartle player-type model, is made up of 4 player-types which sit across an X & Y-axis[1]

Figure N°1: Bartle's Taxonomy of Player Types

Source:https://www.gamify.com/gamification-blog/the-bartle-test-of-gamer-psychology-gamer-types, [Last consultation 13/03/2025, 23:30].

[1] Gamify (2021), « *The Bartle Test of Gamer Psychology: Gamer Types* », Gamify's Official Blog, https://www.gamify.com/gamification-blog/the-bartle-test-of-gamer-psychology-gamer-types, [Last consultation 13/03/2025, 23:30].

Figure N°2: Player Type Breakdown According to Bartle

Source: Bartle's Player Types for Gamification | IxDF ,[Last consultation 13/03/2025, 23:45].

The Player types in The Bartle Test include:

1.2.1. The Achiever

Achievers are individuals who are primarily motivated by points, status, and measurable progress. They derive satisfaction from tracking their achievements and often enjoy showcasing their accomplishments to others, such as by collecting and displaying digital badges. This personality type is particularly responsive to incentive-based systems, such as loyalty programs like Air Miles, where each incremental gain is perceived as a meaningful success. According to Bartle's taxonomy of player types, approximately 10% of individuals fall into the Achiever category. These individuals are easily recognizable often characterized by a competitive spirit and a desire to outperform others, such as claiming to have reached a destination more efficiently than a peer.[1]

Designing a gamified application with Achiever-type users in mind requires more than simply adding leaderboards and badges, although these features serve as effective initial engagement tools for this user group. Achievers are driven by clear goals and visible progress markers, and thus respond well to structured reward systems. However, it is important to accommodate other player types, such as Explorers and Socializers who may not resonate with competitive elements like leaderboards. One inclusive approach is to implement a leveling system that provides Achievers with status-based goals while allowing experience

[1] Kumar, Janaki Mythily, Herger, Mario et Dam, Rikke Friis, *"Bartle's Player Types for Gamification"*, Interaction Design Foundation, https://www.interaction-design.org/literature/article/bartle-s-player-types-for-gamification [Last consultation 13/03/2025, 23:52].

points to be earned through various activities, including social interactions or exploration. This ensures that other user types remain engaged without compromising the Achievers motivation.

Furthermore, structured incentivization schemes, such as those modeled on frequent flyer programs can appeal to Achievers, especially when individual tasks are clearly defined and measurable. These users are typically willing to engage in repetitive or time-consuming tasks, provided the outcomes are explicitly communicated. While they may also participate in exploratory behaviors, similar to Explorers, the challenge level must be sufficiently high to justify their effort. Crucially, the absence of a clearly defined reward whether tangible or symbolic, such as a title or badge can quickly diminish their interest. Achievers require clarity and purpose in their tasks, and vague or ambiguous reward structures are likely to result in disengagement.[1]

1.2.2. The Explorer

Explorers are primarily motivated by curiosity and the desire to uncover new content or hidden features within a system. Unlike Achievers, they are generally less concerned with accumulating points or receiving tangible rewards; for them, the act of discovery itself is intrinsically satisfying. Explorers are often willing to engage in repetitive tasks, provided these efforts eventually lead to the unlocking of new areas or the revelation of so-called "Easter Eggs", hidden elements within a system that may range from simple humorous surprises to fully developed bonus content such as additional video sequences. The element of surprise and the sense of uncovering something unknown are key drivers of engagement for this user type. Approximately 10% of players are classified as Explorers, and they are characterized by a deep interest in probing the boundaries of a system, often experimenting with its mechanics to discover hidden features. For instance, they may interact with seemingly irrelevant aspects of a game environment, such as touching walls to uncover secret passages. Their motivation stems from the personal satisfaction of the discovery itself, rather than from external recognition. To effectively engage Explorers in a gamified system, designers should incorporate features that

[1] Gerald Christians, "*The Origins and Future of Gamification"*, Senior Thesis, Honors College, University of South Carolina, 2018, "The Origins and Future of Gamification" by Gerald Christians .

reward curiosity and exploration, thereby aligning the experience with their intrinsic motivations.[1]

Explorers tend to prioritize interaction with the game environment over direct engagement with other players. Their primary interest lies in exploring the virtual world itself, rather than in social dynamics within that world. They are particularly drawn to expansive, intricately designed environments that offer opportunities for experimentation and uncovering hidden elements. For many Explorers, the process of gaining a deeper understanding of the game's underlying systems and mechanics is inherently rewarding and closely linked to their desire for discovery. Role-playing games (RPGs) are especially appealing to this player type, as they typically feature extensive interactive environments and offer multiple narrative outcomes. Games that provide open worlds or branching storylines present a wide range of possibilities for exploration, making them particularly well-suited to the preferences and motivations of Explorers.[2]

1.2.3. The Socializer

Socializers represent the largest segment of the gaming population, comprising approximately 80% of players. Their primary source of enjoyment stems from interacting with others within the game environment. Socializers are inherently collaborative and derive satisfaction from building relationships and achieving shared goals. They are often willing to contribute to others' progress in exchange for mutual benefits, reflecting a strong orientation toward cooperative gameplay. A prominent example is Farmville, Facebook's most popular game, which appeals to Socializers through its mechanics that encourage reciprocal assistance, such as watering another player's crops in return for resources. These interactions may occur between close friends or casual acquaintances, yet they are equally meaningful in fulfilling the Socializer's motivation for connection. While this player type tends to avoid highly competitive scenarios, it would be inaccurate to assume they lack ambition. Rather, Socializers pursue success through collaboration and community-building rather than direct rivalry.[3]

[1] Janaki Mythily Kumar , Mario Herger and Rikke Friis Dam, Op cit .
[2] Gerald Christians , op cit *P28*
[3] Janaki Mythily Kumar , Mario Herger and Rikke Friis Dam, *Op cit* .

1.2.4. The Killer

The "Killer" player type, despite its ominous designation, represents a legitimate and distinct motivational profile within Bartle's player taxonomy. Killers share similarities with Achievers in that both derive satisfaction from accumulating points and attaining status. However, Killers are uniquely driven by competitive dominance; their motivation stems not merely from personal success but from outperforming others. For Killers, the ultimate objective is to emerge as the best an outcome that inherently requires others to lose. This intense focus on competition and superiority defines their approach to gameplay. Although such traits might suggest a widespread presence, Bartle's research indicates that Killers constitute a very small portion of the player population less than 1%. Their rarity underscores the specialized nature of their engagement, which is centered around competition, control, and measurable victory over peers.[1]

1.3. Core Theories Behind Gamification

Gamification research draws upon a diverse range of theoretical frameworks that help explain how game elements impact human behavior, motivation, and learning.

These core theories can be broadly classified into three categories:

1.3.1. Theoretical foundations related to affect and motivation

1.3.1.1. Self-determination theory (SDT)

Self-Determination Theory (SDT) has developed over several decades as an organismic and dialectical metatheory of human motivation. It extends beyond a mere quantitative understanding of motivation to address its qualitative dimensions, distinguishing between amotivation and various forms of extrinsic and intrinsic motivation. These motivational types are situated along a continuum of relative autonomy, ranging from externally regulated behavior to more autonomous forms such as introjected, identified, and integrated regulation, culminating in intrinsic regulation, the most self-determined form of motivation. Greater autonomy in behavioral reg-

[1] Janaki Mythily Kumar , Mario Herger and Rikke Friis Dam, *Op cit* .

ulation is associated with enhanced well-being and personal development. SDT posits that motivation can become increasingly autonomous through the process of internalization and integration, as explained by Organismic Integration Theory, a core sub-theory of SDT.

Central to SDT are three basic psychological needs: competence, autonomy, and relatedness. These needs are considered fundamental to fostering intrinsic motivation and self-regulation. Applications of SDT often focus on supporting these needs, whether by informing the design of motivational environments, such as games, or by evaluating the extent to which an intervention enhances individuals' perceived competence, autonomy, and relatedness.[1]

1.3.1.2. Flow theory

Flow is defined as a "holistic sensation that people feel when they act with total involvement." This psychological state is marked by deep concentration, a merging of action and awareness, a diminished sense of self-consciousness, and an altered perception of time. The concept of flow is closely linked to intrinsic motivation; individuals experiencing flow engage in an activity not for external rewards but because the activity itself is inherently satisfying. Achieving flow requires a balance between the challenges presented by the activity and the individual's skill level. Furthermore, clearly defined goals and immediate feedback are essential conditions that facilitate the emergence of flow.

In the context of gamified interventions, flow is often assessed as a key indicator of user engagement. Its measurement allows researchers and practitioners to evaluate the effectiveness of gamification strategies and to explore the relationship between the flow experience and subsequent behavioral outcomes.[2]

[1] Jeanine Krath, Linda Schürmann et Harald F.O. von Korflesch, « *Revealing the theoretical basis of gamification: A systematic review and analysis of theory in research on gamification, serious games and game-based learning* », Computers in Human Behavior, *vol.* 125, art. 106963, 2021, pp. 1–33, https://doi.org/10.1016/j.chb.2021.106963.

[2] Ibid.p21

1.3.2. Theoretical foundations related to behavior

1.3.2.1. Theory of reasoned action (TRA)

The Theory of Reasoned Action (TRA), developed by Ajzen and Fishbein, posits that an individual's actual behavior is primarily determined by their behavioral intention. This intention, in turn, is influenced by two key factors: the individual's attitude toward the behavior and the subjective norm. In general terms, individuals are more likely to intend to perform a behavior when they evaluate it positively and when they perceive that significant others expect them to engage in it. Attitude toward the behavior is shaped by behavioral beliefs regarding the expected outcomes whether perceived as favorable or unfavorable while the subjective norm is influenced by normative beliefs concerning the expectations of important referent groups or individuals.

TRA serves as a foundational framework for the Technology Acceptance Model (TAM), and as such, many studies utilize both models in tandem to assess users' acceptance and actual usage of gamified systems. This combined approach allows for a more comprehensive understanding of the psychological mechanisms underlying technology adoption.[1]

1.3.2.2. Theory of planned behavior (TPB)

The Theory of Planned Behavior (TPB) is an extension of the Theory of Reasoned Action (TRA), incorporating the additional construct of perceived behavioral control as a determinant of behavioral intention. Unlike TRA, which focuses solely on attitudes and subjective norms, TPB acknowledges that individuals may also form intentions based on their perceived ability to execute a behavior. Although objective control over a behavior may not always be directly observable or measurable, individuals often possess subjective beliefs about their capability to perform the behavior in question. This concept of perceived behavioral control closely aligns with Bandura’s notion of self-efficacy, as both relate to an individual’s perceived competence in undertaking specific actions.

TPB is frequently employed as a theoretical framework to assess the impact of gamification on behavioral determinants and intention. It has been applied to a variety of contexts, including

[1] Jeanine Krath, opcit .P 23

the intention to adopt renewable energy solutions, such as solar power, the preference for sustainable modes of transportation, and consumer purchasing behaviors. In these cases, gamification is examined in terms of its potential to influence attitudes, perceived norms, and control beliefs, ultimately shaping behavioral intention.[1]

1.3.3. Theoretical foundations related to learning

1.3.3.1. Social learning theory

While acknowledging the relevance of behaviorist principles such as operant conditioning, Social Learning Theory challenges the exclusive emphasis on reinforcement as the primary mechanism of learning. Instead, it highlights the role of observational learning, wherein individuals acquire new behaviors by observing others within their environment. Through this process, individuals internalize actions and outcomes they witness, allowing learning to occur prior to the actual performance of the behavior. According to the theory, four interrelated cognitive and behavioral processes moderate this modeling effect: attention, retention (both imaginal and verbal), reproduction, and motivation or reinforcement.

The principles of Social Learning Theory are frequently applied in the design of gamified interventions. For example, such interventions may incorporate features that facilitate observational learning, such as visible leaderboards or social feeds, or utilize role model characters within the game to guide user behavior. These elements serve to enhance engagement and reinforce desired actions through modeled examples.[2]

1.3.3.2. Social cognitive theory

Building upon the foundations of Social Learning Theory, Social Cognitive Theory emphasizes the dynamic interaction between social and cognitive factors as key determinants of human behavior. Central to this framework is the concept of reciprocal determinism, wherein cognitive, emotional, and biological factors interact with behavioral patterns and environmental influences to shape individual functioning. A core assumption of Social Cognitive Theory is that individuals are not merely passive recipients of external stimuli but active agents operating

[1] Jeanine Krath, opcit .P 23

[2] Jeanine Krath, opcit .P 24

within a broader sociocultural context. Through mechanisms such as intentionality, fore-thought, self-regulation, and self-reflectiveness concepts closely linked to Bandura's notion of self-efficacy, sociocultural influences are internalized and processed psychologically.

Furthermore, cognitive capacities are fundamental to this self-regulatory system. Humans possess the ability to symbolically represent events and anticipate their outcomes, to learn through the observation of others, and to set goals while predicting the consequences of future actions. In the context of gamification research, Social Cognitive Theory informs the design of game-based learning environments by supporting mechanisms that foster vicarious learning and the development of self-efficacy. It also provides a theoretical foundation for evaluating the effectiveness of interventions based on users' outcome expectations and behavioral engage-ment.[1]

By dissecting gamification's core concepts, this section highlights its adaptability across contexts and audiences. The integration of historical insights and theories underscores its potential to motivate users, while acknowledging the need for tailored strategies to address varying demographic needs. These foundational ideas set the stage for analyzing the tools and challenges of implementation in the following section.

Section 2: Core Gamification Instruments and Their Challenges

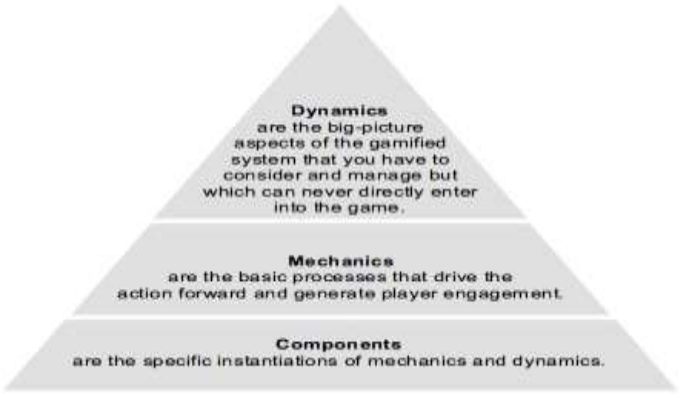
Section 2 delves into the core instruments of gamification by analyzing its main elements: dynamics, mechanics, and components, and reviewing the platforms, software, and technologies that support their implementation. It further explores the dimensions that give gamified systems their structure and impact.

2.1. The main elements of gamification

According to Werbach and Hunter, gamification can be broken down into three main categories: dynamics, mechanisms, and components, the relationship between which can be illustrated by the diagram below.

[1] Jeanine Krath, opcit .P 24

Figure N°3: The hierarchy of game elements



Source : The hierarchy of game elements (Werbach & Hunter, 2012). Download Scientific Diagram

2.1.1. Dynamics

Dynamics refer to the high-level aspects that shape the player's overall experience. They are often abstract and generally invisible to the player. [1]

Table N°1: The Dynamics in Gamification

Dynamics	**Explanation**
Constraint	One of the main ways games engage users is by creating artificial limitations. Without constraints, choices don't matter.
Emotions	Games are powerful and captivating because they tap into emotions. A good way to know if you are using an effective gamified system

[1] Huihui Lu, La gamification dans la formation professionnelle : *« Comment concevoir et utiliser la gamification de manière efficace pour répondre aux besoins de la formation professionnelle ? »*, Mémoire de master 2, Sciences de l'Homme et Société, 2023, HAL Id dumas-04386129, URL : https://dumas.ccsd.cnrs.fr/dumas-04386129v1/file/LU%20Huihui_M2_Dilipem.pdf.

	is to see if it stimulates your emotions. We generally call this 'pleasure'
Narrative	A good gamified experience is coherent. Everything makes sense on its own terms, and the system has an internal logic. Users feel that individual experiences are connected to a larger story, and this narrative can be either explicit or implicit.
Progression	Games are not static. Progression shows how the different parts are connected and how players are motivated to move forward.
Relationships	Many games are social because building relationships inside or outside the game is important for players.

Source : Lu Huihui (2023), La gamification dans la formation professionnelle, https://dumas.ccsd.cnrs.fr/dumas04386129v1/file/LU%20Huihui_M2_Dilipem.pdf[Last consultation 23/03/2025, 23 :51].

2.1.2. Mechanics

Mechanics refer to the processes that drive action and generate player engagement. The table below summarizes the most commonly used mechanics in games. [1]

[1] Ibid, P23.

Table N° 2: The Mechanics in Gamification

Mechanics	**Explanation**
Challenges	Challenges are puzzles or other tasks that require a certain amount of effort to be solved. The effort may involve time, skills, or creativity; the key aspect is that overcoming the challenge demonstrates competence or mastery.
Chance	Chance means there are random elements in your gamification design.
Competition	A structure where one player or group wins and the other loses is the essence of competition.
Cooperation	Cooperation occurs when players must work together to achieve a common goal that is unattainable individually.
Feedback	Feedback is when the game provides the player with information about their performance or progression.
Resources	Acquiring resources in gamification means that players can obtain items that are useful in the game or simply fun to collect.
Rewards	A reward is a benefit given to the player for a specific action or achievement. Rewards can have value within the game (such as bonus

	points or a badge) or outside the game (such as a cash prize).
Transactions	With transactions, players can trade with each other, either directly or through interactions such as a marketplace for buying and selling goods.
Win/Fail States	A win state is a goal that makes a player or a team the winner of all or part of the game.
Turns	Turns are a common mechanic in card and board games, but less so in video games. Taking turns means that not all players need to participate at the same time

Source : Lu Huihui (2023), La gamification dans la formation professionnelle, https://dumas.ccsd.cnrs.fr/dumas04386129v1/file/LU%20Huihui_M2_Dilipem.pdf[Last consultation 23/03/2025, 23 :55].

2.1.3. Components

Components are specific elements that are visible and used by the player. They serve to activate certain game mechanics. The most commonly used components are listed and explained below : [1]

[1] Huihui Lu, Opcit , P24.

Table N° 3: The Components in Gamification

Components	**Explanation**
Achievements	Achievements are defined goals. They may lead to rewards or a player's victory, but neither of these outcomes is required.
Avatars	Avatars are visual representations of a player's character. An avatar can be anything from a simple colored shape to a detailed and customized 3D representation.
Badges	Badges are visual representations of achievements.
Combat	While the mechanic of competition refers to any win/lose struggle, combat is a concrete battle, usually short in duration, and part of a larger conflict.
Boss Battles	A boss battle is a particularly difficult challenge that typically occurs at the end of a level.
Collections	Collections are personal sets of visual items, equipment, or other in-game resources, which can be categorized and, in some cases, made visible to other players.
Content Unlocking	A type of reward that makes new aspects of the game available only when players reach certain objectives is called content unlocking. The new content itself is a form of reward.

Gifting	When the game design allows for gifting, players have the ability to share their resources with others, either within the game or outside of it.
Leaderboard	Leaderboards are visual displays of players' progress and achievements, ranked in order within a specific group of players.
Social Graphs	A social graph is a representation of the social connections players have built over their time in the game, showing their friends as potential allies, competitors, or other participants within the game. They are commonly used in social games.
Points	Points are numerical representations of progress within the game
Quests	Quests are specific examples of predefined challenges for players. A quest is usually
	tied to a narrative and may have rewards specified from the outset.
Teams	Teams are defined groups of players who work together to achieve a common goal.
Virtual Goods	Virtual goods are valuable in-game assets that are often translated into real-world value. This usually happens by allowing players to purchase them with real money or by enabling players to sell virtual goods through online marketplaces.

Source : Lu Huihui (2023), La gamification dans la formation professionnelle, https://dumas.ccsd.cnrs.fr/dumas04386129v1/file/LU%20Huihui_M2_Dilipem.pdf[Last consultation 23/03/2025, 23 :51].

2.2. Tools for Implementing Gamification

Implementing gamification effectively depends on using the right tools to engage users and achieve desired outcomes. These tools support the design, deployment, and monitoring of gamified experiences across various contexts. And those tools are:

Gamification platforms provide a comprehensive set of tools for incorporating game elements into marketing initiatives. They enable the design, deployment, and management of interactive campaigns, often featuring pre-built templates and engagement mechanics.

Gamification software offers greater customization, allowing organizations to develop tailored gamification applications and apply targeted techniques to enhance user engagement.

Gamification technologies including game engines and advanced analytics tools, support the creation of immersive and interactive experiences while enabling the measurement and optimization of their effectiveness.

Finally, **loyalty tools** are specifically designed to reinforce customer retention by integrating reward systems, challenges, and incentives into the customer journey, thereby fostering long-term brand engagement.[1]

Table 4 : Comparison of Tools

Tool	Functionality	Advantages
Gamification Platforms	Enable the creation of interactive games and facilitate campaign management.	Seamless integration and centralized control.
Gamification Software	Support the development of customized gamification applications.	High flexibility and extensive personalization capabilities.

[1] Kimple, *« Les outils indispensables pour mettre en place une gamification efficace, » Kimple (© 2024),* https://www.kimpleapp.com/Blogs/articles-blog/gamification/les-outils-indispensables-pour-mettre-en-place-une-gamification-efficace, [Last consultation 23/03/2025, 00 :30].

Gamification Technologies	Utilize game engines and analytics tools to enhance interactivity and engagement.	Enable performance monitoring and continuous optimization.
Loyalty Tools	Provide reward systems and recurring challenges to stimulate user participation.	Strengthen customer retention and foster brand loyalty.

Source:https://www.kimpleapp.com/Blogs/articles-blog/gamification/les-outils indispensables-pour-mettre-en-place-une-gamification-efficace,[Last consultation 23/03/2025, 00:30].

2.3. The dimensions of gamification

Recent studies by Feng et al. and Toda et al. have independently identified a consistent set of gamification dimensions that effectively enhance user engagement across diverse domains. Feng et al. applied these dimensions within youth basketball training programs, while Toda et al. explored their application in educational environments. The convergence of their findings underscores the versatility and universal applicability of these gamification elements in fostering motivation and sustained participation.

2.3.1. Measurement and performance dimension

Feedback mechanisms must be consistently present within gamified systems to ensure users receive **acknowledgment** of their actions. In this context, the absence of acknowledgment can lead to user frustration, as their efforts and interactions may be perceived as unrecognized or insignificant. Conversely, poorly designed or irrelevant feedback may result in unintended consequences and diminish the overall user experience.

The **Level** element is particularly significant when associated with **Progression**. Without clearly defined levels, learners may feel that they are not advancing in their skills, which can negatively affect motivation. Similarly, **Progression** itself is widely recognized as a critical factor in gamified learning environments, regardless of gender. The absence of visible progression may induce feelings of frustration and anxiety among learners.

In addition, **Stats**, or performance indicators are commonly integrated into educational platforms. The lack of such information may cause learners to feel disoriented or disconnected from their learning trajectory, as they are unable to track their progress or evaluate their performance effectively.[1]

This gamification design outlines how the system dynamically responds to user behavior, specifically targeting basketball fans. To progress within the system, students are required to complete training activities outlined in their personalized programs. As users complete these tasks, they ascend through predefined levels Novice, Expert, and Master representing the **Level** game element. Successful task completion awards users with sport points **(Points)** and contributes to their advancement along a visual progress bar, represented by stars **(Progress).**

Basketball training tasks are structured across multiple levels, and users receive varying point values depending on the complexity and level of the task, serving as a form of Acknowledgment. Additional points are granted for completing daily and weekly challenges **(Points),** further encouraging consistent engagement. Victories in online basketball tournaments are rewarded with sports coins **(Points),** and users who accumulate a sufficient number of coins and rank among the top three on the leaderboard receive medals as a form of **Acknowledgment.**

All performance metrics and achievements are consolidated on the "My Personal Achievements" page within the Personal Information section, which functions as the **Stats** element by allowing users to track their progress and accomplishments.[2]

Shared Strategy: Both studies emphasize performance tracking through feedback mechanisms like points, badges, and progress indicators to motivate users.

[1] Toda, Armando M., Klock, Ana C. T., Oliveira dos Santos, Wilk, Palomino, Paula T., Rodrigues, Luiz A. L., Shi, Lei, Bittencourt Santana Gasparini, Ig, Isotani, Seiji, & Cristea, Alexandra I. (2019). *"Analysing gamification elements in educational environments using an existing Gamification taxonomy".* Smart Learning Environments, 6(1), Article 16. https://doi.org/10.1186/s40561-019-0106-1.

[2] Feng, Zeping; Lau, Man Lung; Zhu, Mengxiao; Liu, Mengru; Rehe, Refati; Huang, Xiao; Lee, Kun Pyo. (2023*). "Behavioural design of gamification elements and exploration of player types in youth basketball training".* Smart Learning Environments, 10, Article 56. https://doi.org/10.1186/s40561-023-00278-2

Contextual Adaptation :

- **Education:** Employs assessments and progress bars to inform students of their learning achievements.

- **Basketball Training:** Uses performance metrics and achievement badges to track skill development and training milestones.

2.3.2. Personal dimension

This dimension is directly linked to the learner's experience within the educational environment. It encompasses elements that, although intrinsic to instructional settings, may not always be consciously perceived by learners as gamified components.

Among these elements, **Objective** is universally present across educational platforms, as the primary aim is to guide learners toward acquiring or practicing specific knowledge or skills. However, poorly designed objectives can inadvertently encourage undesirable behaviors for example, emphasizing the quantity of completed tasks may lead students to prioritize task completion over understanding. The absence of clear objectives can result in confusion and a lack of direction. According to Toda et al., the objective element is one of the most critical components in gamified educational environments.

To counteract the potential monotony of static or repetitive learning contexts, **Novelty** plays a key role by introducing variety and maintaining learner interest. Nonetheless, integrating novelty often poses design challenges, as it typically requires either manual content development or sophisticated automated generation techniques.

The **Puzzle** element, typically represented through cognitive challenges or problem-solving tasks, is another fundamental component. It stimulates active engagement and critical thinking. Its absence may render the environment passive or uninspiring for instance, a learning platform that only offers video content without interactive tasks may lead to learner disengagement or boredom.

Lastly, **Sensation** refers to the aesthetic and sensory appeal of the learning interface. A visually engaging and pleasant design can significantly enhance the user experience. While some educational environments are beginning to integrate emerging technologies such as Augmented Reality (AR) and Virtual Reality (VR) in combination with gamification, these applications

remain in early stages of development. Nonetheless, according to Toda et al., Sensation is considered a highly relevant element in enhancing user engagement in educational settings.[1]

This gamification design defines both the objectives and structure of the user experience. The primary goal for users is to complete personalized and adaptive training plans, which are displayed daily on the application's home page (**Game Element: Objective**). If a user receives a low rating on a given day's training, they are offered the opportunity to review the coach's recommendations and repeat the session. Additional training time is rewarded with bonus points, reflecting the system's emphasis on continuous improvement (**Game Element: Renovation**).

Upon completing a stage or chapter, users can unlock a special feature titled *Retracing the Ballerina Path*, which introduces new cognitive and physical challenges (**Game Element: Puzzle**). When this unlocked chapter is updated with new basketball drills, users receive sensory notifications auditory, visual, or through device vibration ensuring immediate awareness of content updates (**Game Element: Sensation**). These drills reflect the integration of **Novelty** into the system, offering fresh, engaging experiences that maintain user interest over time.[2]

Shared Strategy: Personalization is key in both contexts, allowing users to set individual goals and tailor experiences to their preferences.

Contextual Adaptation :

- **Education:** Offers customizable learning paths and objectives to cater to diverse student needs.

- **Basketball Training:** Provides individualized training plans and challenges based on player profiles and motivations.

2.3.3. Social dimension

This dimension focuses on the social aspects of the learning environment, specifically the elements that connect individuals and influence their behavior in relation to tasks. As it

[1] Toda et al. op.cit. P11
[2] Feng, Zeping. op.cit P11

centers on interactions among learners rather than between learners and the system, careful design considerations are essential to avoid unintended negative effects.

Competition can foster a motivating and dynamic atmosphere by encouraging learners to outperform their peers in pursuit of specific rewards. However, it also carries the risk of demotivation, particularly when a learner consistently underperforms or perceives themselves as falling behind. Therefore, competitive elements must be implemented with sensitivity to individual differences in performance and self-perception.

In contrast, Cooperation is widely regarded as a beneficial component in educational settings, promoting knowledge sharing and collaborative effort. Its absence may lead to learner isolation, increasing the risk of disengagement and reduced motivation. When implemented effectively, cooperation fosters mutual support and accountability, encouraging learners to contribute meaningfully to group success. A notable real-world example of successful cooperation is Wikipedia, where collective contributions enhance shared outcomes.

Reputation pertains to the social status a learner may achieve within the environment for example, being recognized as the "Best Student" in a course. Similar to points or acknowledgment systems, the absence of reputation mechanisms can make learners feel that their efforts are insignificant. However, reputation features must be thoughtfully designed to prevent discouragement among those who do not attain such recognition.

Lastly, Social Pressure, though often considered one of the less impactful elements, can play a supportive role when applied constructively. For instance, encouraging high-performing students to motivate peers who are struggling can foster a sense of community and shared responsibility. Assigning peer-review tasks may also invoke mild social pressure, which when carefully managed can enhance engagement and accountability. [1]

This gamification design emphasizes social interaction by integrating collaborative and competitive gameplay elements. Users are required to participate in a basketball game alongside teammates, with each player assigned a specific role. Success depends on mutual support and coordinated effort, fostering disciplined movement and effective teamwork **(Game Element: Cooperation).**

[1] Toda et al. op.cit. P11

The team that demonstrates the highest level of coordination and performance is awarded the title of "Top 10 Team" and is featured on the team leaderboard, reinforcing a sense of competitive achievement **(Game Element: Competition)** and social recognition **(Game Element: Reputation).** Additionally, if a team's ranking is surpassed by another, users receive a notification informing them of the drop in standings. This mechanism introduces a subtle form of social pressure, encouraging users to re-engage and strive to maintain their team's status **(Game Element: Social Pressure)**.[1]

Shared Strategy : Both environments foster social interaction through features like leaderboards, collaborative tasks, and peer recognition to enhance motivation.

Contextual Adaptation :

- **Education:** Encourages collaboration and competition among students to build a learning community.
- **Basketball Training:** Focuses on team-based challenges and peer comparisons to simulate real-game social dynamics.

2.3.4. Ecological dimension

This dimension pertains to environmental properties that can be subtly implemented to encourage users to adopt desired behaviors. These elements do not necessarily dominate the user experience but play a critical role in shaping engagement and motivation.

Chance introduces an element of randomness, influenced by the user's luck. While randomness can enhance excitement, it also risks discouraging users who repeatedly experience failure. To mitigate this, strategies such as guaranteed success after a certain number of attempts can be employed to maintain motivation and fairness.

Economy, when poorly aligned with educational objectives, may divert learners' attention from core content. However, when integrated meaningfully such as allowing students to spend virtual currency on classroom-related advantages like postponing assessments it can enhance relevance and engagement.

[1] Feng, Zeping. op.cit P11

Rarity involves the inclusion of limited-time events or exclusive rewards (e.g., badges), which can serve as strong motivational drivers. Nevertheless, over-reliance on scarce resources or overly restrictive access can frustrate learners, whereas the complete absence of rare or time-sensitive elements may lead to monotony and disengagement.

Finally, **Time Pressure** functions as a motivational constraint, challenging learners to complete tasks within set limits. While excessive pressure can be counterproductive, the total absence of time constraints may result in a lack of urgency, leading to reduced engagement and boredom.[1]

This gamification design illustrates how the system encourages young basketball enthusiasts to adopt and maintain desired behaviors through structured engagement mechanisms. Users, referred to as "hobbyists," are required to select a personalized basketball training plan and complete a sequence of tasks organized into daily, monthly, and stage-based activities (Game Element: Imposed Choices).

Upon aligning with a customized plan, users are eligible to receive random rewards such as points or small gifts upon successful completion of stage tasks, thereby incorporating elements of Chance into the experience. Tasks vary in their temporal constraints: daily tasks must be completed within the same day, while monthly tasks are bound to the current calendar month (Game Element: Time Pressure). If users successfully complete all tasks within the specified time frame, they are awarded additional points and exclusive achievement badges (Game Element: Rarity), reinforcing their commitment and progress.

Furthermore, accumulated points can be redeemed in a virtual store for customization items or tangible sports-related gifts, linking in-game performance to real-world or aesthetic rewards (Game Element: Economy). This integration of randomized incentives, time-bound challenges, and redeemable rewards is strategically designed to sustain user motivation and align behavior with the platform's educational and athletic objectives. [2]

Shared Strategy : Both studies utilize environmental mechanics such as time constraints, chance elements, and resource management to guide user behavior and maintain engagement.

[1] Toda et al., op. cit. P10
[2] Feng, Zeping. op.cit P11

Contextual Adaptation :

- **Education:** Implements elements like randomized rewards and time-limited tasks to encourage consistent student participation and focus.

- **Basketball Training:** Incorporates daily and monthly tasks with specific time requirements, offering random rewards and a point-based economy to motivate players.

2.3.5. Fiction dimension

This dimension is often overlooked in the design of gamified educational environments. This is largely because most gamification frameworks do not distinguish between the different layers of Narrative and the concept of Storytelling. **Narrative** pertains to the learner's interaction with the system and is influenced by their personal characteristics. When effectively designed, it can help direct the learner's attention toward the educational content rather than the surrounding game elements. **Storytelling**, on the other hand, is a means of expressing the Narrative through the use of text, audiovisual elements, and other sensory stimuli, shaping how the story or context is conveyed. A lack of Narrative may reduce student engagement and diminish focus on the learning content. Similarly, the absence of Storytelling can create confusion about the context, leaving students uncertain about the purpose of specific gamified tasks. Storytelling can provide thematic context to the learning environment, such as presenting a scenario where the learner is battling a boss that loses health with each correctly completed task.[1]

The initial interface of the gamified basketball training system reflects this gamification design. Young basketball enthusiasts are introduced to a training guide that outlines how to complete various drills and engage in online competitions. Simultaneously, they can replicate player highlights by watching stories of their favorite athletes and taking part in the "Retracing the Path of the Stars" activity an example of the storytelling game element. In the personal profile section, users can create their own avatars and share them on social media or showcase their training progress to others, illustrating the narrative game element. [2]

Shared Strategy: Narrative elements and storytelling are employed to create immersive experiences that resonate with users.

[1] Toda et al., op. cit. P12
[2] Feng, Zeping. op.cit P11

Contextual Adaptation :

- **Education:** Utilizes educational storylines and thematic scenarios to contextualize learning materials.

- **Basketball Training:** Applies sports-related narratives and scenarios to make training sessions more engaging and relatable.

2.4. Challenges and Limitations in Gamification

Gamification holds great potential, but its implementation comes with certain challenges. These obstacles can impact the effectiveness and sustainability of gamified systems. Below are some of the key challenges and limitations commonly encountered in gamification initiatives:

2.4.1. Keeping gamification ethical

Maintaining ethical standards in gamification is essential for creating engaging yet responsible user experiences. As product leaders, you hold a critical responsibility in designing gamification strategies that respect user well-being and align with ethical principles. This section highlights the key ethical considerations in product development and offers practical guidance on implementing ethical gamification.

A foundational aspect is **transparency**. Users should clearly understand how gamification mechanics influence their behavior, the goals of these mechanisms, and how their data is collected and used. Transparent communication fosters trust and empowers users to make informed decisions about their engagement.

Another crucial principle is **fairness**. Gamified systems must offer equal opportunities for all users to succeed, regardless of factors like gender, race, or socioeconomic background. This requires thoughtful design of game mechanics and reward systems to avoid bias or exclusion. Promoting fairness not only supports inclusivity but also helps ensure a level playing field for every participant.

Moreover, product leaders must avoid **manipulative or exploitative designs**. While gamification can effectively boost motivation, it should not encourage addictive behaviors or compromise users' well-being. The focus should be on creating experiences that align with users' values, support their goals, and lead to positive, meaningful interactions.[1]

2.4.2. Balancing gamification and user privacy

Balancing engaging gamification with strong user privacy protections is vital in today's data-sensitive digital landscape. Ensuring ethical gamification requires a strong commitment to user data security and transparency.

One of the most important elements is compliance with privacy regulations, such as the General Data Protection Regulation (GDPR). Product leaders must fully understand these regulations and ensure all gamification strategies meet legal standards. This includes securing explicit user consent for any data collection, storage, and processing.

Consent should be obtained through clear, accessible mechanisms that inform users of what data is being collected, how it will be used, and offer easy ways to give or withdraw permission. Communicating your data policies including any third-party involvement builds trust and helps users feel secure in their interactions with the system.

Regularly review and update privacy policies to reflect changes in data handling or gamification design. This ensures ongoing transparency and aligns with ethical standards.[2]

2.4.3. Ensuring gamification doesn't harm the user experience

Gamification should enhance, not disrupt, the overall user experience. While game elements are powerful tools for increasing engagement and motivation, poor implementation can lead to cluttered interfaces, user frustration, and a loss of focus on core objectives.

Take, for example, the hypothetical Hi-Z Fitness app, designed to help users track physical activity and progress toward fitness goals. If overloaded with gamified features, the app could end up undermining its own purpose. Consider these potential issues:

[1] HYZY Mike, WARDLE Bret , ZICHERMANN Gabe (2023) , Op.cit. P190
[2] HYZY Mike, WARDLE Bret , ZICHERMANN Gabe (2023) , Op.cit. P192

Too Many Badges and Achievements: Rewarding users for every minor action may dilute the value of achievements, making the interface feel cluttered and less meaningful.

Overly Complex Challenges: Introducing game-like tasks and puzzles can overwhelm users who simply want to track fitness, not play games.

Frequent Notifications and Popups: Excessive alerts related to gamification can disrupt users' focus and detract from the core functionality.

Irrelevant Virtual Rewards: Providing virtual goods or currencies that don't align with users' fitness goals can shift attention away from meaningful progress.

In such cases, gamification hinders rather than supports the user journey. Product leaders must find a balance, ensuring that gamified elements complement the primary goals of the product. This can be achieved through thoughtful design and continuous user testing.

Effective strategies might include offering personalized rewards for hitting fitness milestones, presenting insightful progress data, and integrating social features that foster support and connection. These features align with users' real-world goals and promote long-term engagement without overwhelming them.[1]

While gamification instruments offer powerful engagement mechanisms, their success hinges on balancing creativity with usability. The section underscores the risks of poorly designed systems, such as alienating users through excessive competition, and stresses the importance of iterative testing to mitigate limitations. These insights transition into understanding how user engagement metrics validate or challenge gamification's efficacy.

Section 3: overview of User Engagement and its relationship with gamification

This Section provides an overview of user engagement and examines its intricate relationship with gamification. It defines what user engagement entails, outlines various

[1] HYZY Mike, WARDLE Bret , ZICHERMANN Gabe (2023) , Op.cit. P196

measurement approaches from self-report and physiological methods to web-analytics and assesses how gamification can enhance engagement metrics.

3.1. User Engagement

User Engagement (UE) is a core component of user experience, defined by the depth of a user's cognitive, emotional, behavioral, and temporal investment during interactions with a digital system. Over the past two decades, the field of Human-Computer Interaction (HCI) has increasingly focused on understanding, designing for, and measuring engagement across various digital contexts, including health, education, gaming, social media, news, and search platforms.

Research consistently shows that UE is highly context-dependent. Each digital environment offers distinct technological affordances that interact with users' motivations to achieve specific goals. For example, in Massive Open Online Courses (MOOCs), users may enroll for reasons ranging from professional development to general curiosity. They engage with diverse learning resources, such as video lectures, quizzes, and discussion forums to varying extents, shaped by their personal goals and preferences. Hence, MOOC designers must consider how individual learners' needs influence their engagement and what outcomes they seek from the course.

In contrast, engagement within digital news environments operates differently. While personal goals play a role, the nature and presentation of content often drive situational interest, which can spark and sustain engagement. These comparisons underscore that digital platforms attract users for distinct purposes (e.g., to learn, to socialize, to stay informed), aim to engage them for varying durations (e.g., a 10-minute news session vs. a multi-week MOOC), and pursue diverse outcomes (e.g., ongoing readership, course completion).

The abstract and dynamic nature of UE further complicates its study. There is general agreement that UE encompasses emotional, cognitive, and behavioral dimensions. These elements are adapted from research on student engagement in learning sciences. Emotional engagement refers to users' positive or negative feelings toward system content or other users, which can influence their connection to the platform. Cognitive engagement reflects the mental effort users invest, often influenced by how well the task matches their skill level leading to states such

as boredom, flow, or frustration. Behavioral engagement, in turn, involves observable actions like clicking, querying, or time spent on a task.

Despite growing understanding of these dimensions, identifying reliable indicators of engagement remains challenging. For example, high time-on-task or increased physiological arousal may signify deep engagement or confusion and frustration. Recent studies have tried to clarify these experiences. Edwards monitored participants electrodermal activity during search tasks, manipulating frustration through delayed responses. Grafsgaard analyzed facial expressions and body movements in students using intelligent tutoring systems. Both researchers correlated physiological signals with self-reported data to differentiate between engaged and frustrated states.

Although neurophysiological tools can track interaction over time and in real-time, they face challenges such as signal noise, data volume, and synchronizing inputs from multiple sources (e.g., eye tracking and user behavior). Crucially, interpreting such data to infer psychological states like engagement requires a robust conceptual framework.

To this end, researchers have proposed several models and attributes to operationalize UE. For example, Jacques, studying educational multimedia, identified six key attributes: attention (focused or distracted), motivation, perceived control, needs satisfaction, time perception ("dragging" or "flying by"), and emotional response. Similarly, Webster and Ho differentiated between attributes of engagement, such as focused attention, curiosity, and intrinsic interest and factors influencing engagement, like challenge, control, feedback, and content variety.

Building on this work, O'Brien conducted a multidisciplinary literature review and interview study with diverse digital users (learners, shoppers, gamers, and searchers). She proposed a broader set of UE attributes, including challenge, aesthetic and sensory appeal, feedback, novelty, interactivity, perceived control, awareness, motivation, interest, affect, and time perception. These were integrated into a Process Model of User Engagement, consisting of four stages: point of engagement, sustained engagement, disengagement, and re-engagement. The model reflects how engagement attributes rise and fall in response to users' evolving needs throughout their digital interaction journey.[1]

[1] O'Brien, Heather L.; Cairns, Paul; Hall, Mark (2018), *« A Practical Approach to Measuring User Engagement with the Refined User Engagement Scale (UES) and New UES Short Form »*, International Journal of Human-Computer Studies, vol. 112, pp. 28–39, https://doi.org/10.1016/j.ijhcs.2018.01.004.

3.2.User engagement Meausurments

User engagement is a multifaceted, complex phenomenon with emotional, cognitive and behavioural dimension. This gives rise to a number of potential approaches for its measurement, including:

3.2.1. Self-report measurements

User engagement can be measured by asking users about their experiences through self-reports such as interviews, questionnaires, or diaries. These capture users' perceptions of digital media usability, attractiveness, and intuitiveness, as well as their feelings and thoughts during or after interaction. The key value of self-reports lies in the fact that subjective experience matters: even if objective data shows engagement, if users don't feel engaged, they won't view the system positively or continue using it.

For example, a consumer may spend a lot of time on an online store and complete a purchase, suggesting smooth engagement. But if asked, the consumer might reveal that the site was difficult to navigate and the purchase process frustrating, which would likely discourage future use. This shows that self-reports offer a more complete understanding of user motivation and future intentions than behavior alone.

Self-reports also help interpret performance data by highlighting what aspects enhance or hinder engagement. They are widely used in human-computer interaction research due to their convenience and versatility, though designing effective self-report tools requires careful effort and expertise to ensure reliability and relevance.

There are three main self-report approaches:

1. **Discrete**, users select predefined terms describing their experience and rate their intensity or duration (e.g., the PANAS scale measuring emotions on a Likert scale).
2. **Dimensional**, experiences are mapped on continuous scales without predefined categories, like semantic differential scales or the Affect Grid (measuring pleasure-displeasure and arousal-sleepiness).

3. **Free response**, users describe their experiences in their own words, allowing richer, qualitative insights.[1]

3.2.2. physiological measurements

Physiological measures evaluate how the body functions and can range from simple methods, like measuring body temperature, to complex ones, such as using an electrocardiograph to monitor heart activity. Of particular interest are physiological indicators linked to cognitive and emotional states, captured by sensors, cameras, or software. These include:

- **Eye tracking**, which monitors pupil dilation and fixation to indicate task difficulty, attention, fatigue, mental effort, and strong emotions.
- **Mouse pressure**, associated with stress levels or confidence in responses.
- **Biosensors**, measuring variables like skin temperature (linked to relaxation or negative emotions), electrodermal activity (arousal), blood flow (stress and emotional intensity), and muscle or facial movements (emotional response and attention).

Research shows these physiological signals relate to attention, emotions, aesthetics, and novelty, making them useful indicators of engagement. For example, Jennett et al. found that during immersive experiences, eye movements decreased over time, suggesting users focus more narrowly when engaged.[2]

3.2.3. web analytics measurements

User engagement measurements through web analytics involve extracting parameters believed to influence engagement from the digital footprints users leave while interacting with a website, commonly called website logs. Unlike self-report and physiological methods, which typically focus on a relatively small group considered representative of the larger population, web analytics generally cover the entire user base of a website. However, the data collected via web analytics tends to be less detailed and often relies on indirect indicators. For instance, dwell time the duration a user spends on a page is commonly used as a proxy for user interest, even though factors like page length and reading complexity also impact this measure. While these metrics don't directly explain why users engage, the fact that millions visit a site daily strongly

[1] Lalmas, Mounia; O'Brien, Heather; Yom-Tov, Elad (2013), « *Measuring User Engagement* », https://mounia-lalmas.blog/wp-content/uploads/2018/01/mue.pdf, [Last consultation 17/04/2025, 12:06].
[2] Ibid, P32

suggests high engagement. Additionally, by modifying elements such as site layout or structure and observing changes in user behavior, web analytics can offer implicit insights into what drives user engagement.[1]

3.3. Gamification Enhance User Engagement

Gamification has emerged as a powerful strategy for increasing user engagement by applying game design elements in non-game contexts. By integrating features like rewards, challenges, and competition into digital platforms, gamification taps into users' intrinsic motivations, making interactions more engaging, enjoyable, and goal-driven.

3.3.1. Incorporating Game Elements

Gamification refers to the integration of game-like features and mechanics into non-game environments to boost motivation and user engagement. By leveraging intrinsic human drives, such as achievement, competition, and social interaction gamification encourages users to engage more deeply with digital platforms.

Common elements include points and badges, which reward users for completing tasks or reaching milestones. Points can accumulate to unlock rewards or elevate a user's status, while badges act as visible symbols of achievement. Progression systems offer structured challenges, goals, and levels that users can advance through, providing a sense of mastery and accomplishment. Additionally, achievements and unlockables, such as exclusive content, virtual goods, or premium features serve as incentives for users to explore and participate more actively within the platform.[2]

3.3.2. Rewards and Incentives

Rewards and incentives play a key role in motivating users to perform desired actions. These can be tangible (e.g., coupons, discounts, or freebies) or intangible (e.g., digital badges or virtual currency), and are effective in increasing engagement, encouraging conversions, and building user loyalty.

[1] Mounia Lalmas,et al, Opcit , P 47
[2] Nwaimo Chioma Susan, Adegbola Ayodeji Enoch, Adegbola Mayokun Daniel (2024), *« Data-Driven Strategies for Enhancing User Engagement in Digital Platforms »*, International Journal of Management & Entrepreneurship Research, vol. 6, no. 6, pp. 1854–1868, https://www.fepbl.com/index.php/ijmer/article/view/1170.

Virtual rewards, though lacking real-world value, often hold strong motivational power within a platform. They can be awarded for completing tasks or reaching specific goals. Behavior-based incentives, such as for purchases, referrals, or surveys encourage actions that benefit the platform. Social recognition, including features like leaderboards, achievement displays, or user profiles, helps foster community interaction and validates user efforts, reinforcing ongoing participation.[1]

3.3.3. Progress Tracking and Leaderboards

Progress tracking and leaderboards give users insight into their achievements and performance relative to others, encouraging competition and sustained interaction.

Personal progress tracking tools, such as completion bars, progress meters, or dashboards offer real-time feedback, motivating users to reach their goals. Leaderboards rank users based on metrics like activity, contributions, or accomplishments, promoting a sense of competition and social comparison that can enhance user commitment and performance.[2]

By linking these gamification techniques with engagement metrics, this section illustrates how well-designed game elements can promote lasting user involvement.

Understanding the structure and purpose of game mechanics provides a foundation for building engaging, user-centric digital experiences. When effectively aligned with user needs and measured properly, gamification becomes a powerful tool for driving interaction and motivation.

[1] Ibid, P1860
[2] Chioma Susan Nwaimo et al. Opcit, P1860

Conclusion

In summary, Chapter I has delineated how gamification synthesizes game mechanics and theories to create engaging experiences across multiple domains. We have highlighted its historical roots, diverse applications, core instruments, and both the motivational benefits and potential pitfalls inherent in its implementation. By unpacking the mechanics, dynamics, and affective responses that drive engagement and by introducing key metrics for measuring success this chapter provides the theoretical compass needed for effective gamification design.

These theoretical insights set the stage for Chapter II, which will offer practical frameworks, design guidelines, and real-world case studies to guide the sustainable implementation of gamification systems aimed at maximizing user engagement

Chapter II: Assessing User Engagement through a gamified system: an applied approach

Chapter II: Assessing User Engagement through a gamified system: an applied approach

Introduction

This chapter aims to translate the theoretical concepts discussed in the first part of this study into a concrete, real-world analysis. By focusing on Heetch, a ride-hailing platform that integrates gamification elements into its driver interface, we investigate how gamified systems influence user engagement. Through this applied approach, we want to evaluate whether gamification strategies effectively enhance driver engagement , participation, and retention.

The first section provides a detailed presentation of Heetch, outlining its services, core business model, and strategic positioning in the competitive mobility market. This background is essential for understanding the context in which the gamification features are deployed.

The second section presents the univariate analysis, including the methodology used for data collection and processing. The primary data source consists of telephone interviews conducted with a representative sample of 494 Heetch drivers, we use XLSTAT to conduct descriptive statistical analysis.

The third section deepens the analysis with a bivariate approach, using cross-tabulations to test the three hypotheses formulated in the previous chapter. This section aims to explore relationships between gamification strategy and the dimensions of user engagement, and to identify statistically significant correlations.

This structured methodology allows us to empirically assess the impact of gamified elements on driver engagement, contributing both to academic understanding and practical implications for platforms like Heetch.

Chapter II: Assessing User Engagement through a gamified system: an applied approach

Section 01 : Presentation of Heetch's company

This section provides an overview of the host company, Heetch**,** beginning with a brief look at its origins and evolution. We will present the company's current structure, highlighting how it is organized to support its operations. Finally, we will explore Heetch's main goals and objectives, shedding light on its strategic direction and mission within the ride-hailing industry.

1.1. The Origins and History of Heetch

1.1.1. The Origins of Heetch

the narrative begins in 2005, when the two principal founders Teddy and Mathieu first collaborated on event organization during their engineering studies, while a third founding contributor, Aylic, concurrently pursued software development training at Epitech. Following divergent professional experiences including one founder's engagement in Morocco to assist with the launch of a Groupon-style platform the idea for a peer-to-peer ride-sharing service emerged in early 2013, prompted by recurrent difficulties in securing return transportation from suburban social events influenced by the Berlin party scene. At that time, Paris's ride-sharing sector comprised established operators such as Uber, Chauffeur Privé, and LeCab, each constrained by limited driver supply and correspondingly higher fare structures, while in the United States Lyft had been operational for six months and was preparing to secure a US $60 million funding round amidst evolving regulatory frameworks. In April 2013, Teddy and Mathieu, as full-time cofounders, together with Hector (design), Nicolas (iOS development), and Amir (backend development) who collectively invested in and constructed the minimum viable product commenced platform development, culminating in the official launch of the Heetch application during the first weekend of September 2013.

1.1.2. The History of Heetch

Phase I: Inception and Weekend-Only Pilot (September 2013 – May 2014)

- September 2013: After several months of internal development, Heetch officially launched its night-ride application, operating only between 20 h and 6 h from Thursday to Saturday and targeting primarily young users returning from suburban events.

- The launch program relied on partnerships with Parisian nightclubs, where two to three drivers waited outside venues and negotiated fares directly with departing patrons driving a reported 10 % average week-on-week growth in rides.

- May 2014: A third co-founder joined the leadership team, the race management module went live, and sustained flyer distribution campaigns at major discos increased nightly trip counts to around 200 per evening.

Phase II: Payment Innovation and Formal Staff Expansion (September 2014 – December 2014)

- September 2014: Heetch became one of the first French platforms to introduce in-app credit-card payments, offering both cash and card options and thus distinguishing itself from traditional taxis.

- December 2014: Weekly ride volumes surpassed 7 000, prompting the hiring of the company's first full-time employees to support growing operational needs

Phase III: Regulatory Suspension and Crisis Management (June 2015 – March 2017)

- June 2015: Violent protests by taxi drivers at Paris airports led the Prefecture of Police to suspend peer-to-peer ride-sharing applications including Heetch for six months.

- During the ban, clandestine operations resulted in driver arrests and police interventions, motivating the founders to establish a crisis-management cell (legal counsel, public affairs advisors, PR specialists) to defend the platform's peer-to-peer model .

- The Tribunal de Grande Instance of Paris condemned Heetch for complicity in the illegal practice of taxi profession, compelling the company to cease the original peer-to-peer service and relaunch exclusively with professional chauffeurs available 24 h/24 and 7 j/7.

Phase IV: Professional VTC Pivot and Fundraising (March 2017 – January 2018)

- Following the legal injunction, Heetch's relaunch with professional drivers and round-the-clock availability drove renewed growth, culminating in an estimated 100 000 weekly trips by early 2018.

- 26 January 2018: The company closed a €16.5 million funding round led by Alven, Via ID, Felix Capital, Idinvest and InnovAllianz to support continued scale-up in France and Europe.

Phase V: Geographic Expansion and Francophone Growth (2018 – September 2019)

- April 2019: Heetch launched a pilot moto-taxi service in Abidjan (Côte d'Ivoire), leveraging francophone cultural ties and aiming for rapid West-African deployment.

- September 2019: A €34 million growth round was secured to accelerate expansion across French-speaking Africa, coinciding with the inauguration of "Heetch El Djazaïr" in Algeria staffed entirely by a local team to ensure market fit.

- Concurrently, community events (parties, meet-ups) in France underscored Heetch's social-mobility ethos and reinforced brand engagement

1.2. Presentation of HEETCH

HEETCH is a digital platform specializing in chauffeur-driven vehicle services (VTC), accessible via a mobile application compatible with both Android and iOS operating systems. The application facilitates on-demand transportation by connecting passengers with professional drivers, thereby enhancing urban mobility.

Users can register on the platform using their email address, phone number, or social media accounts, enabling them to request rides efficiently. The application ensures transparency and security by providing detailed information about the assigned driver, including the vehicle's license plate number, the driver's full name, and the car model.

HEETCH offers competitive fare estimates, often lower than traditional taxi services, and supports various payment methods, including cash and credit/debit cards, depending on the

country of operation. The platform operates continuously, 24 hours a day, 7 days a week, catering to the diverse transportation needs of its users.

Currently, HEETCH has established its presence in multiple countries, including France, Belgium, Morocco, Algeria, Angola, Senegal, Cameroon, and Côte d'Ivoire.

1.3. Presentation of HEETCH EL DJAZAYER

In alignment with its strategic expansion into Francophone Africa, HEETCH launched its Algerian subsidiary, HEETCH EL DJAZAYER, in September 2019. This initiative aimed to address the growing demand for reliable urban transportation solutions in Algeria's rapidly expanding cities, where public transport infrastructure may be limited.

The launch event was marked by a press conference held at the Sofitel Hotel in Algiers, attended by HEETCH's CEO and co-founder, Teddy Pellerin, alongside local partner Nassim Lounes, an entrepreneur recognized for his contributions to the digital sector in Algeria.

HEETCH EL DJAZAYER operates under a local entity, adhering to Algeria's investment regulations, and employs a team composed entirely of Algerian professionals. This approach ensures that the service is tailored to the local market's cultural and operational nuances.

The platform offers the same core functionalities as its international counterpart, including 24/7 availability, transparent fare estimates, multiple payment options, and detailed driver information to ensure passenger safety. By leveraging local expertise and adapting to regional needs, HEETCH EL DJAZAYER contributes to enhancing urban mobility and creating employment opportunities within Algeria.

1.3.1. Products and Services Offered by the Organization

Heetch El Djazair is currently in a growth phase, actively working to establish and secure its position within the Algerian mobility market. As such, its range of products remains focused and strategic, aiming to deliver high value while ensuring sustainable scalability. The core offering of Heetch is its mobile application, which serves as the primary platform

connecting passengers with reliable and affordable transportation options. This product represents a Business-to-Consumer (B2C) model, providing individual users with a convenient, user-friendly, and cost-effective means of getting around urban and suburban areas.

In addition to its B2C services, Heetch also operates within a Business-to-Business (B2B) framework. The company partners with organizations seeking dependable mobility solutions for their employees. Through tailored offers that balance competitive pricing and high service quality, Heetch supports corporate clients in managing the daily transportation needs of their workforce.

Furthermore, Heetch places strong emphasis on customer support services, ensuring user satisfaction through responsive assistance, clear communication, and continuous service improvement. This customer-centric approach reinforces the brand's commitment to delivering both value and reliability in every aspect of the mobility experience.

1.3.2. Heetch strategic orientation

The elements that define an organization's identity, core beliefs, and future direction are captured in its purpose, vision, and values. Heetch has articulated these aspects by clearly stating its identity and the impression it aims to leave on its users. Accordingly, we will explore each component individually, following the sequence outlined below:

- **Values**

- **Be kind :**

At Heetch , our ride isn't just about speed it's about how we ride together. Kindness fuels our journey, making the road ahead smoother for everyone.

This value is represented by a burning heart a symbol of passion and warmth. The fire keeps us driven, while the heart reminds us to lift each other up. A fast ride needs a steady hand, and a challenging ride needs a heart full of love to keep moving forward.

- **Play for the team :**

At Heetch, our ride isn't a solo sprint it's a coordinated effort, where everyone plays a role in keeping the momentum going. Success comes from moving together, staying aligned, and pushing forward as a team.

This value is represented by paddles a symbol of the coordination and effort required by a ship's crew to keep the vessel balanced and moving toward its destination. Just like in a race, every stroke matters: if one side slows down or loses rhythm, the whole ship drifts off course. Only by working in sync, supporting each other, and focusing on the bigger picture can we navigate challenges and reach our goals.

- **Make it happen :**

At Heetch, a great idea means nothing without action. We don't just dream we build, push, and accelerate until our ideas turn into reality. Every challenge is a chance to find solutions, move fast, and make an impact.

This value is represented by the wheel and the wings a symbol of the drive to take off and set things in motion. The wheel keeps us grounded, reminding us that progress happens when we roll forward, not when we stand still. The wings reflect the ambition and determination to take our ideas beyond what seemed possible.

- **Think different :**

At Heetch, we don't just follow the road we carve our own path. The best rides aren't predictable, and neither are we. Innovation, courage, and authenticity fuel our journey, ensuring that every turn we take is uniquely Heetchier.

This value is represented by the stairs to the unknown a symbol of boldness and curiosity. It reflects the courage and daring spirit of those who push beyond the familiar, seeking new ways that will take us to places we never imagined. Ordinary thinking keeps us on the same road; bold thinking sets us on new lands.

Figure N°4 : HEETCH Values

Source: Company's internal resources

- **Missions :**

In Algerian society, a prevailing lack of trust often hinders free movement. Heetch aims to address this issue by fostering transparency, valuing user feedback, and building strong, trust-based relationships between drivers and passengers. By creating enjoyable and safe travel experiences, Heetch seeks to cultivate mutual confidence and transform everyday mobility. Our strength lies in solving problems efficiently from beginning to end, enabling the development of an accessible and affordable transportation network. Heetch's core objectives can be summarized as follows :

- Create a fair, balanced marketplace that benefits both drivers and passengers.
- Provide a humane and practical solution for payment processing.
- Build a reliable, inclusive mobility network accessible to all.
- Promote a positive culture where partners are respected and valued, encouraging a movement based on goodwill.
- Challenge conventional mobility habits by offering a fun, affordable alternative.
- Protect the company's interests while ensuring enough regulatory compliance to sustain innovation.

- Foster a sense of community among riders ensuring they feel welcome from the moment they download the app to the time they complete their ride.
- Deliver a safe, cost-effective, and transformative mobility solution for the Algerian population.
- Inspire trust and optimism by sharing real user experiences that highlight Heetch's impact.
- Strengthen user loyalty through empathetic, user-centered CRM strategies.

➢ **Vision :**

Heetch envisions a world where transportation is not just a necessity but a pleasant, inclusive experience available to everyone, everywhere. By harnessing the power of innovation and empathy, Heetch is committed to reshaping the mobility landscape on a global scale. Our long-term vision includes :

- **Making Mobility Universally Accessible:** We strive to eliminate barriers to transportation by offering affordable, easy-to-use mobility solutions for all communities urban, suburban, and rural alike.
- **Humanizing Technology:** As we evolve technologically, our focus remains on people. Heetch designs its digital solutions to be intuitive, empathetic, and centered around real human needs, making tech feel more like a companion than a tool.
- **Supporting the Growth of Emerging Cities:** Heetch is actively contributing to the development of new and expanding urban areas by providing the infrastructure and services that empower people to move, connect, and grow together.

1.4. Organizational Description

Heetch El Djazair is the Algerian branch of the parent company based in France. As a startup, it benefits from a flexible and dynamic internal organization that reflects the forward-thinking values of its leadership. Thanks to its open-minded management style, Heetch has cultivated a workplace culture that emphasizes enjoyment, collaboration, and motivation. This positive and

engaging internal environment is a cornerstone of the company's operational philosophy, fostering both productivity and employee satisfaction. A concise technical overview of the company structure is provided in **(Figure N°5)**

Moving into its internal organization, Heetch El Djazair operates through four key functional areas:

1.4.1. The Operations Team

The Operations Team is often seen as the engine of Heetch El Djazair, playing a central role in the company's daily function. This team, led by an Operations Manager, is dedicated to managing driver-related activities. Their core mission revolves around acquiring, onboarding, and supporting partner drivers throughout their journey with Heetch. The team's responsibilities are divided into two primary areas:

- **Acquisition**: Identifying, attracting, and integrating new driver-partners into the platform.
- **Retention**: Ensuring current drivers remain engaged, satisfied, and supported through continuous follow-up, assistance, and relationship management.

This structure allows the operations team to build a solid and reliable driver network, ensuring a high-quality service for passengers.

1.4.2. The Customer Care Team

At the heart of customer relationship management, the Customer Care Team plays a vital role in ensuring a positive experience for all users both passengers and drivers. Their main focus is ticket management, which involves handling feedback, inquiries, and complaints through the CRM system.

This team addresses service-related issues, manages negative experiences, and implements strategies to improve customer satisfaction. Whether it's calming a frustrated user or resolving a service hiccup, the team is committed to showing users that Heetch is always at their service, ready to listen and act with care.

1.4.3. The Marketing Team

As a digitally driven company, Heetch El Djazair relies heavily on modern tools and adaptable strategies, making its marketing function essential to its growth and visibility. The team includes a Marketing Manager, a Graphic Designer, and a Community Manager, who work together to build and maintain the brand's presence across digital platforms.

Their main responsibilities include:

- Managing social media channels and crafting content aligned with the brand identity and user expectations.
- Running digital marketing campaigns and collaborating with influencers or partners.
- Designing promotional visuals, handling email marketing, and planning advertising initiatives.
- Monitoring market trends and competitors to inform future marketing strategies.

Through creativity and strategic thinking, the marketing team ensures that Heetch remains visible, engaging, and relevant in the Algerian market.

1.4.4. The Administrative Team

Although it consists of just one person, the Administrative Team led by the Office Manager handles a wide range of critical functions within the organization. This role is essential in ensuring smooth coordination and internal communication across departments.

Key responsibilities include:

- Coordinating team efforts and producing internal summary reports.
- Overseeing human resources, including payroll and employee management.
- Maintaining relationships with partners, managing contracts, and ensuring compliance with operational objectives.
- Handling budgeting, accounting, procurement, and negotiations with suppliers.
- Organizing internal and external events, as well as travel arrangements for the team.

Despite being a one-person team, the Office Manager plays a pivotal role, carrying significant responsibilities that directly impact the efficiency and cohesion of the company.

Following the overview of Heetch El Djazair's internal structure and key functional teams, the organizational chart is presented below to visually illustrate the company's hierarchy and workflow.

Figure N°5 : Organizational chart of HEETCH EL DJAZAIR

Source: Company's internal resources

Getting to know Heetch where it started, how it's structured today, and what it aims to achieve, gives us a clearer picture of the company behind the service. By understanding its journey and vision, we can better appreciate the decisions it makes and the direction it's heading in. This context will be valuable as we dive deeper into how Heetch operates and evolves in the coming sections.

Chapter II: Assessing User Engagement through a gamified system: an applied approach

Section 2: Univariate Analysis

Over a focused three-month period, We conducted comprehensive telephone interviews with 494 active Heetch drivers to examine the impact of gamified systems on user engagement. The company provided access to a total population of 2,000 drivers, from which the interviews were drawn. While the volume of calls was substantial, it provided a robust foundation for the study. With a 4% margin of error at a 95% confidence level, the findings drawn from these interviews are not merely anecdotal, they are statistically reliable and offer meaningful insights into driver behavior and motivation.

The univariate analysis presented in this section focuses on examining individual variables collected from the survey. By analyzing each variable individually, We aim to uncover patterns and trends that reveal how specific elements of gamification influence driver engagement. This step is essential for understanding how key factors are distributed and centralised within the Heetch platform.

2.1. Methodology of study and Data presentation

In this section, the methodological approach employed to investigate my master's dissertation on the impact of gamified systems on user engagement within the Heetch application was presented. To gather comprehensive insights, telephone interviews were conducted with active Heetch drivers.

2.1.1. Methodology of study

Telephone interviewing services fall into two basic categories, quantitative and qualitative:

Computer Assisted Telephone Interviewing (CATI) is primarily a quantitative data collection method, which uses a blend of live telephone interview and optional Interactive Voice Response (IVR) survey interviews to rapidly collect information from your targeted sample. CATI surveys often contain one or two open-ended questions asked by a live interviewer. Software systems immediately process results and perform initial analysis. Quota control is built-in to our

systems: software actively tracks progress without the time lag which often occurs when interviews occur in the field.

Telephone In-Depth Interviewing (Telephone IDI) involves qualitative research. A trained in-depth interviewer conducts an interview over the phone with a targeted respondent, using a topic guide instead of a structured questionnaire. Telephone IDIs enable Research America's interviewing team to reach more respondents than on-site or live face- to -face interviews allow logistically.[1]

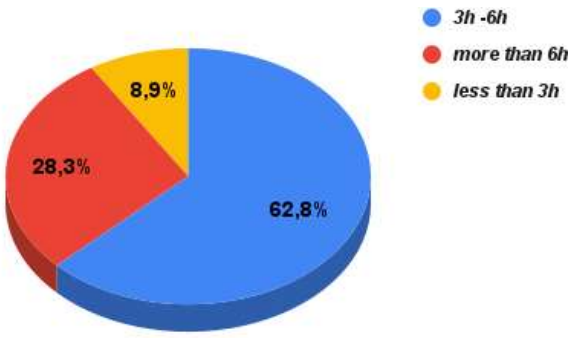
Over a three-month period, we conducted a comprehensive telephone survey targeting the population of Heetch drivers2,000 individuals; The company facilitated this process by providing us with each driver's unique ID and granting access to their internal platform, where accurate contact information(phone numbers , their regions ,there rides and their available communication times) could be retrieved. Each week, we logged into the platform, identified a batch of driver IDs, and initiated calls during specified time windows to maximize response rates. Throughout this journey, we encountered scheduling conflicts, occasional number changes, and language nuances, but by systematically following up and adapting our calling strategy, we were able to secure 494 valid interviews. This sustained effort over twelve consecutive weeks yielded a robust dataset reflecting drivers' perceptions of Heetch's gamified features and their impact on engagement.

2.1.2. Data presentation

A series of telephone interviews was conducted to explore the behavioral patterns and motivational factors influencing Heetch drivers in their interaction with the Application. A total of 494 responses were collected, offering valuable insights into the dynamics of user participation and engagement within a digitally mediated work environment.

[1] Research America Inc. (2025), « *Marketing Research Telephone Interviews* », Research America, https://researchamericainc.com/services/marketing-research-telephone-interviews.php, [Last consultation 05/25/2025, 19h10].

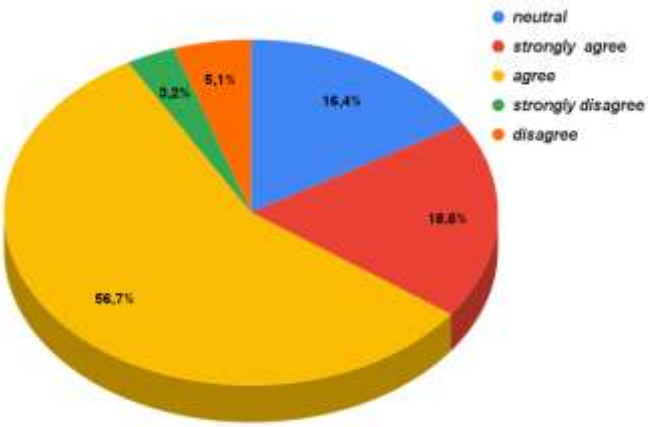
Figure N° 6: Average Daily Usage Time of the Application



Source :XLSTAT

This graph represents the answers to the question "*On average, how many hours per day do you work with the heetch application?*" and shows that most drivers (62.8 %) spend a solid 3-6 hours per day using the Heetch app, making this the 'sweet spot' of everyday use. This suggests that many drivers divide their time between personal responsibilities and work on the app. Additionally, some drivers have other jobs, using Heetch as a complementary or secondary source of income, which reflects the application flexibility in adapting to different working patterns; a substantial minority (28.3 %) are true power users, logging over six hours daily and covering long shifts; for them, the application serves as a principal source of income. meanwhile, just (8.9 %) dip in for less than three hours, a group that may include newcomers, part-timers, or those who haven't yet discovered Hetch's full potential.

Figure N°7: Impact of Application Notifications and Objectives on Route Planning

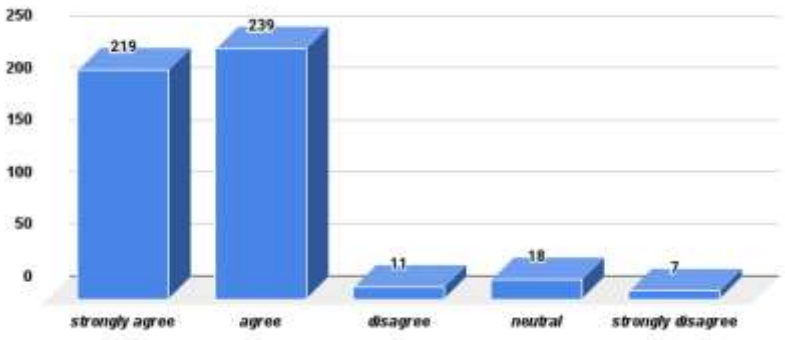


Source : XLSTAT

This graph represents responses to the statement: *"The notifications and objectives displayed in the application help me better plan my routes." (Dimension cognitive)* A clear majority (56.7%) agree and (18.6%) strongly agree indicating that (75.3%) of drivers find these in-app cues genuinely beneficial for mapping out efficient trips and staying on schedule. This makes the "agree" segment the peak of engagement. Meanwhile, (16.4%) remain neutral , suggesting they notice the prompts but are either unconvinced of their value or use them only sporadically.

A small minority (8.3%), comprising 5.1% who disagree and 3.2% who strongly disagree, actively feel that the notifications either don't align with their routing needs and this may be linked to the fact that some drivers are less educated, or that the messages themselves are not clearly written or easy to understand, marking this as the least engaged segment.

Figure N°8: Effect of Trip-Based Bonuses on Drivers Daily Scheduling

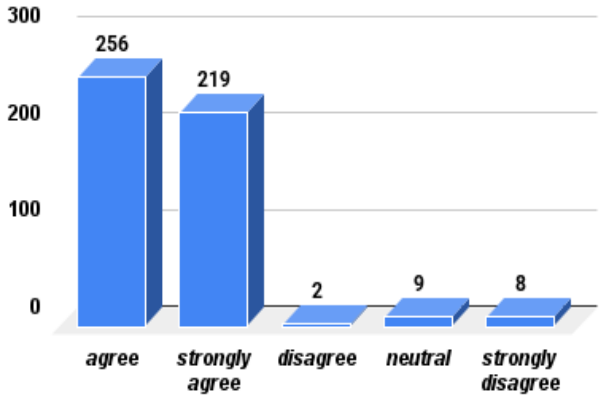


Source : XLSTAT

According to responses from 494 participants regarding the bonus system *(e.g., bonuses awarded after completing a certain number of trips)* within *the behavioral dimension*, the majority of drivers expressed a positive perception. Specifically, 239 respondents agreed and 219 strongly agreed, indicating that 458 drivers (or 92.7%) view the bonus system as a strong motivator for organizing their workday. This clearly shows that the current system is highly effective in encouraging drivers to complete more rides in order to increase their income. on the other hand, only 18 drivers (3.6%) selected a neutral response, suggesting a lack of strong opinion regarding the system's influence on their planning, possibly because some of them remain indifferent or unconvinced by the underlying gamification approach.

A very small minority disagreed (11 drivers) or strongly disagreed (7 drivers), making up just 3.6 % of the total responses. This small group could reflect users who find the bonus thresholds unrealistic or not well-suited to their working style. Overall, with "agree" as the most selected option and "strongly disagree" as the least, the data strongly supports that the bonus system is an effective motivator for most drivers.

Figure N°9: Gamified vs. Non-Gamified System Effects on User Experience



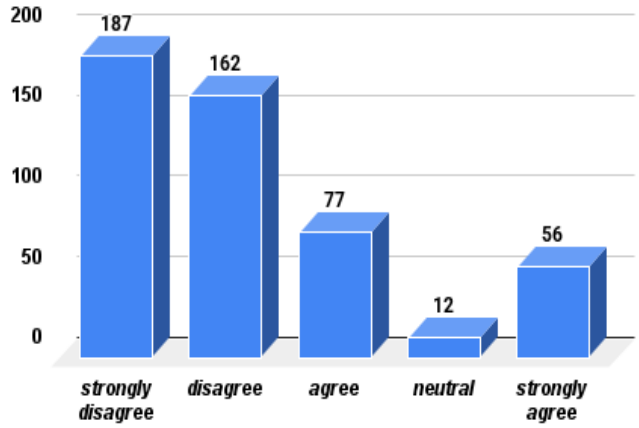
Source : XLSTAT

This graph represents responses to the statement*: "Gamification significantly increases my engagement, motivation, and satisfaction compared to a non-gamified system*", we found that the vast majority view gamified systems very positively. A combined 475 respondents (or 96.2 %) agreed (256) or strongly agreed (219) that gamification significantly boosts their experience compared to non-gamified systems making "agree" the most selected answer and highlighting gamification as a key driver of user satisfaction.

Only 10 respondents (2.0%) disagreed or strongly disagreed, which may be attributed in part to the fact that some of them are older drivers who prefer to focus on completing simple rides without engaging with additional game-like elements

For then, Nine respondents (1.8%) remained neutral, which suggests a small group may not yet perceive a major difference, due to some individuals feel demotivated at times when they are unable to complete certain challenges, which could reduce the perceived effectiveness of the gamification system.

Figure N°10: How Financial Rewards Influence App Usage

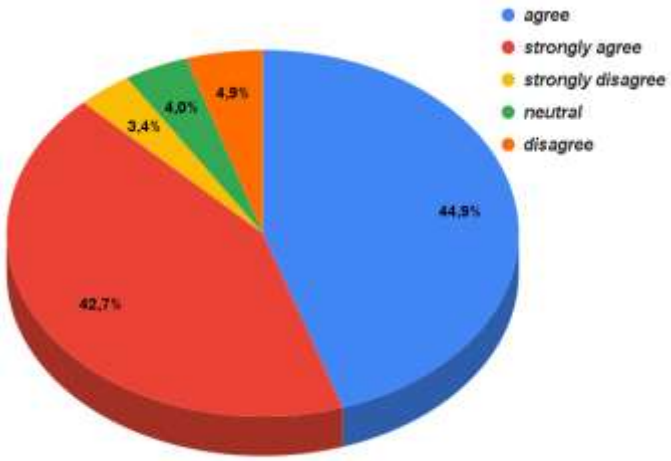


Source : XLSTAT

According to 494 respondents to the question about *"financial incentives and bonuses as a main source of motivation" (Financial dimension)*, we found that most drivers do not view them as their primary reason for using the application. A total of 349 respondents disagreed with the statement (162 disagreed and 187 strongly disagreed), representing 70.6% of the sample—making 'strongly disagree' the most selected response and indicating that financial rewards are not the dominant factor driving engagement, where many drivers explained that they prioritize other considerations, such as the pricing of rides, the behavior and attitude of clients, or overall working conditions, over the pursuit of bonuses alone.

In contrast, only 133 respondents agreed (77 agreed and 56 strongly agreed), which accounts for 26.9%, while for some financial incentives still serve as a motivator, particularly when the ride prices are low, helping to offset earnings during less profitable periods.while 12 respondents (2.4 %) remained neutral.

Figure N°11: The Role of Recharge Incentives in User Engagement



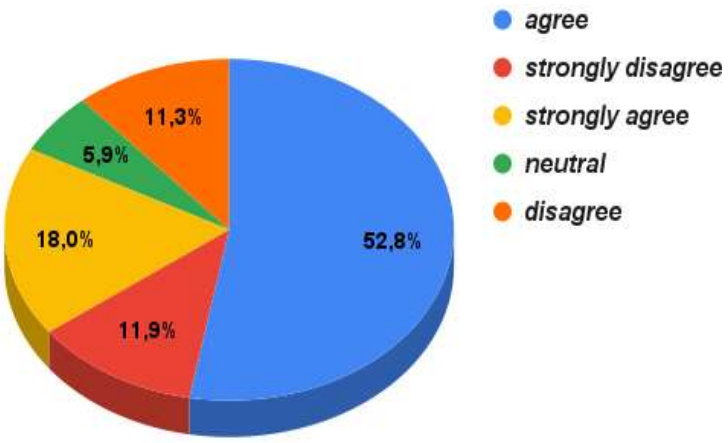
Source : XLSTAT

When asked about the impact of the recharge system and its associated bonuses *(Accessibility dimension)*, most respondents reported a positive experience. Out of 494 participants, 433 agreed (222) or strongly agreed (211), making up 87.7% of the total and several drivers noted that while recharging the balance can sometimes be difficult due to financial or logistical reasons, the bonus system helps alleviate this challenge by delaying the need for frequent recharges and supporting ongoing access to the app.

Meanwhile, 41 respondents (8.3%) disagreed (24) or strongly disagreed (17), with some indicating that their disagreement stems from religious beliefs, considering certain aspects of the system to be 'haram' or religiously impermissible

A smaller group of, 20 respondents (4.1%) remained neutral, owing to a limited understanding of the concept itself. In some cases, financial constraints also prevented them from fully benefiting from the recharge system.

Figure N°12: Impact of Driver Rankings and Rewards on Performance Improvement

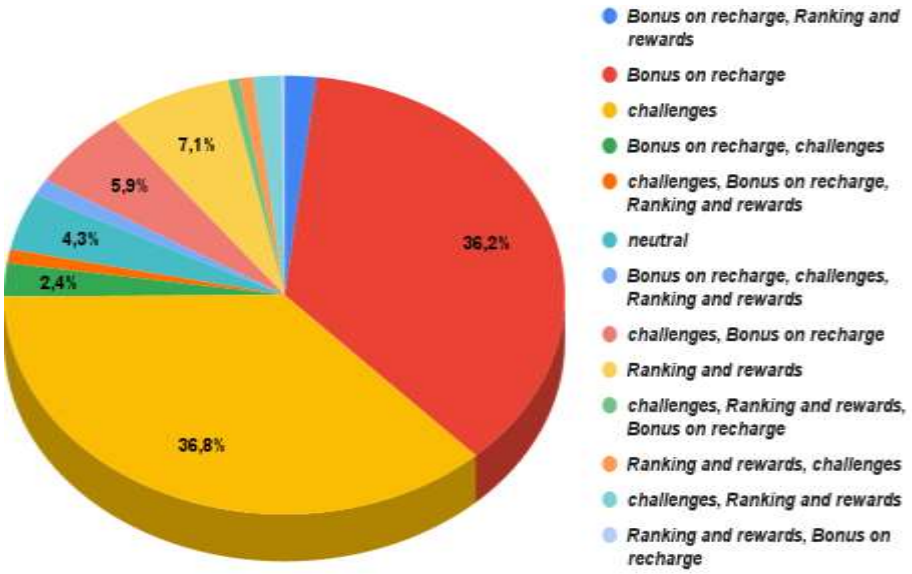


Source : XLSTAT

In response to the question about whether the ranking of the best drivers and associated rewards motivate performance *(Social dimension)*, a majority of participants expressed positive sentiment. Out of 494 respondents, 350 agreed (261) or strongly agreed (89), representing 70.9% of the sample and Many drivers indicated that this system motivates them to work harder in order to reach the top ranks and be classified among the first tier of performers.

Brief 115 respondents disagreed (56) or strongly disagreed (59), making up 23.3% of the total, suggesting that for nearly a quarter of users, the ranking system is less motivating partly because many drivers do not work throughout the entire week and therefore feel they have little chance of reaching the top ranks.

Figure N°13: Top Motivational Strategy Among Users



Source : XLSTAT

In response to the question *"Among the following strategies, which motivates you the most?"*, the results reveal a clear preference for practical and goal-oriented incentives, with challenges and recharge bonuses leading the way. Out of 494 participants, 182 respondents selected "challenges" as the most motivating factor, making it the top individual strategy. Close behind, 179 respondents chose "bonus on recharge", showing that financial and task-based incentives hold strong motivational power among users.

Combined options that included these two such as "challenges and bonus on recharge" (29 responses) or "bonus on recharge and challenges" (12 responses) further reinforce the appeal of combining short-term goals with financial rewards. In contrast, "ranking and rewards" as a standalone motivator was selected by only 35 respondents, suggesting that competitive gamification elements may appeal to a smaller subset of users. A few respondents chose more complex

combinations (e.g: all three strategies or dual mixes), but these remained in the minority. Notably, 21 respondents selected "neutral," indicating either indifference or a lack of clarity regarding which strategy most motivates them.

Overall, the data strongly suggests that task driven features (like challenges) and financial incentives (like recharge bonuses) are the most effective motivational tools. This implies that future engagement strategies should continue to emphasize these elements perhaps by introducing personalized challenges linked with bonus opportunities while still keeping ranking systems available for users who respond positively to competition.

2.1.3. Discussion of Results

The results show that most Heetch drivers (62.8%) work between 3 to 6 hours a day, which seems to be the ideal balance between personal life and Application activity. This suggests that many drivers use the app flexibly, some as a main job, others as a side hustle. A significant minority (28.3%) spend over 6 hours, clearly relying on it as a main income source, while a smaller group (8.9%) work less than 3 hours, likely including newcomers or occasional users.

When it comes to in-app notifications and objectives, most drivers (75.3%) find them useful for planning their routes and staying organized. This shows that these features play an important role in helping drivers manage their time. Still, a small portion felt they were unclear or not adapted to their needs, possibly due to education level or how the messages are written.

The bonus system based on the number of completed trips was also seen very positively, with 92.7% agreeing it helps them plan their workday. It clearly encourages drivers to stay active and reach their goals. On the other hand, a very small number felt it didn't suit their work style, maybe because the targets felt out of reach.

A large majority (96.2%) also said that gamified features increased their motivation and satisfaction compared to a non-gamified system. This confirms how powerful these elements can be. The few who disagreed were often older drivers or those who felt discouraged when they couldn't complete certain challenges.

Interestingly, most drivers (70.6%) said that financial incentives alone are not their main motivation. Many put more importance on other aspects, like ride prices, client behavior, or general working conditions, showing that money isn't the only thing that drives engagement.

The recharge bonus system was positively received by 87.7% of drivers. It helps ease the pressure of recharging by offering bonuses, even if some drivers face financial or religious barriers. A small group stayed neutral, often due to a lack of understanding or limited access to the feature.

The ranking system was also motivating for most drivers (70.9%), though nearly a quarter didn't find it helpful, often because they work part-time and feel they can't compete for top spots.

Finally, when asked which strategy motivated them most, drivers clearly preferred challenges and recharge bonuses over rankings. This shows that practical, short-term goals with real rewards are what truly drive engagement for most users.

Section 3: Bivariate analysis

As part of the empirical component of this research, a bivariate statistical analysis was conducted in order to examine the relationships between key variables related to gamification and user engagement. The data used for this analysis were collected from a sample of drivers provided by the company Heetch. The bivariate analysis allowed for the identification of significant correlations between gamification features and drivers' behavioral, cognitive, emotional, and motivational responses, providing valuable insights into the effectiveness of gamified systems in real-world contexts.

Chapter II: Assessing User Engagement through a gamified system: an applied approach

3.1. Cross-Analysis of "The bonus system pushes me to organize my day to maximize my earnings and Financial bonuses are my main motivation for using the app."

Table N°5: How Bonuses Help Drivers Plan Their Day with Financial Incentives Drive Driver Motivation

	Financial bonuses are my main motivation for using the app						
The bonus system(e.g., bonus after X trips)pushes me to organize my day to maximize my		*Agree 2*	*Diagree 4*	*Neutral 3*	*Strongly Agree 1*	*Strongly Disagree 5*	*Grand total*
Agree 2		41	90	7	19	82	239
Disagree 4			3			8	11
Neutral 3		1	4	3	1	9	18
Strongly Agree 1		36	65	2	35	81	219
Strongly disagree 5					1	6	7
Grand total		78	162	12	56	186	494

Source : Developed by the researcher using XLSTAT

The cross-analysis highlights notable patterns in how users perceive financial motivation and the bonus system's influence on their daily behavior. A particularly striking result is the 90 users who agreed that the bonus system pushes them to organize their day, yet disagreed that financial rewards are their main motivation suggesting that bonuses may influence behavior even without a strong financial focus. Another significant group of 81 users strongly agreed that the bonus system helps structure their day while strongly disagreeing that money is their primary motivator, indicating a possible influence of gamification or routine. In contrast, 35 users showed clear consistency by strongly agreeing with both statements, reflecting a purely incentive-driven engagement. At the opposite end, only six users strongly disagreed with both statements, and just one user was neutral about the bonus system but strongly agreed with financial motivation, showing that such mismatches are relatively uncommon. These figures suggest that while financial rewards are a key motivator for many, other psychological or structural factors may also drive user behavior.

3.1.1. Chi-Square Test

- H0 (Null hypothesis):

There is no significant relationship between drivers organizing their day around bonuses and being financially motivated.

- H1 (Alternative hypothesis) :

There is a significant relationship between drivers organizing their day around bonuses and being financially motivated.

Table N°6: Chi-Square Test Results (H1)

Chi-square statistic (χ^2)	42.38
p-value	0.00002
Significance level (α)	0.01 (1%)

Source : Developed by the researcher using XLSTAT

Since $p = 0.00002 < 0.01$, we reject the null hypothesis (H_0).

The Chi-square test reveals a statistically significant relationship between drivers' agreement with organizing their day around bonuses and their motivation driven by financial incentives.

This suggests that behavioral engagement (structuring work for optimal earnings) is meaningfully associated with financial motivation. In practical terms, drivers who plan their day to maximize bonuses are significantly more likely to report that financial incentives are their primary motivation for using the Heetch application.

While the Chi-Square test reveals a statistically significant association between bonus-driven behavior and financial motivation, the qualitative cross-tabulation suggests that this relationship is not uniform. A large portion of users who structure their workday around bonuses do so without citing financial incentives as their main motivator. This implies that other mechanisms,

such as gamification, habit formation, or a desire for routine, may mediate the observed statistical relationship

3.2. Cross-Analysis of "Notifications and objectives help drivers to plan theme routes and Gamification significantly increases my engagement, motivation, and satisfaction compared to a non-gamified system"

Table N°7: How In-App notifications and objectives Helps Drivers Plan with Why Gamified Features Work Better Than a Non-Gamified System

	Gamification significantly increases my engagement, motivation, and satisfaction compared to a non-gamified system						
The Notifications and objectives help me plan my routes.		*Agree 2*	*Diagree 4*	*Neutral 3*	*Strongly Agree 1*	*Strongly Disagree 5*	*Grand total*
Agree 2		153		2	122	2	279
Disagree 4		12		5	7	1	25
Neutral 3		60		1	18	3	82
Strongly Agree 1		22	1		69		92
Strongly disagree 5		9	1	1	3	2	16
Grand total		256	2	9	219	8	494

Source : Developed by the researcher using XLSTAT

The cross-analysis between practical features and motivational design shows that users who value in-app guidance also tend to appreciate gamification. The highest concentration, with 153 users, is found among those who agreed with both statements indicating that when drivers find guidance tools like notifications helpful, they also tend to view gamification as a meaningful enhancement to their motivation and satisfaction. Another strong alignment appears with 69 users who strongly agreed with both statements, showing an even deeper commitment to the gamified experience and its practical benefits. On the opposite end, the lowest values include only two users who strongly disagreed with both statements, and just one user who remained

neutral about both, suggesting that indifference or total rejection of both features is very rare. Additionally, 12 users showed a clear disconnect by disagreeing that notifications help with planning while also agreeing with the value of gamification, which may reflect a more skeptical or disengaged segment of the user base.

3.2.1. Chi-Square Test

- H0 (Null hypothesis):

  There is no significant relationship exists between the role of notifications and objectives in route planning and the increased engagement, motivation, and satisfaction provided by gamification compared to a non-gamified system.

- H1 (Alternative hypothesis) :

  There is a significant relationship exists between the role of notifications and objectives in route planning and the increased engagement, motivation, and satisfaction provided by gamification compared to a non-gamified system.

Table N° 8: Chi-Square Test Results (H2)

Chi-square statistic (χ^2)	5.48
p-value	0.064
Significance level (α)	0.10 (10%)

Source : Developed by the researcher using XLSTAT

Since **p = 0.064 < 0.10**, the result is statistically significant at the 10% level.

The Chi-square test reveals a statistically significant relationship at the 10% significance level between the role of notifications and objectives in route planning and the increased engagement, motivation, and satisfaction provided by gamification compared to a non-gamified

system. With a p-value of 0.064 and a Chi-square statistic of 5.48, the null hypothesis can be rejected at the 10% threshold.

In more practical terms, drivers who pay attention to notifications and goals while planning their routes tend to feel more engaged, motivated, and satisfied when using the gamified version of the system. Features like real-time prompts and progress objectives don't just guide their work, they seem to make the experience more dynamic and rewarding. This suggests that gamification isn't just about adding fun elements; it can genuinely help drivers feel more connected to their work and more in control of their day.

3.3. Cross-Analysis of "the recharge system and its bonuses making it easier to access rides and encouraging continuation and Which strategy motivates theme the most."

Table N°9: How the Recharge System Helps Drivers Stay Active with Why It's One of the Most Motivating Features

	Which strategy motivates you the most														
The recharge system and its bonuses make it easier to access rides and encourage me to continue		Bonus on recharge	Bonus on recharge, challenges	Bonus on recharge, challenges, Ranking and rewards	Bonus on recharge, Ranking and rewards	Challenges	Challenges, Bonus on recharge	Challenges, Bonus on recharge, Ranking and rewards	Challenges, Ranking and rewards	Challenges, Ranking and rewards, Bonus on recharge	Neutral	Ranking and rewards	Ranking and rewards, Bonus on recharge	Ranking and rewards, challenges	Grand total
Agree 2		80	4	4	4	88	8	1	4	1	5	20	1	2	222
Disagree 4						18			1	1	3	1			24
Neutral 3						7	1		1		9	2			20
Strongly Agree 1		99	8	2	5	59	20	4	2	1		10		1	211
Strongly disagree 5						11					3	2		1	17
Grand total		179	12	6	9	183	29	5	8	3	20	35	1	4	494

Source : Developed by the researcher using XLSTAT

The cross-analysis between users' perceptions of the recharge system and the motivational strategies that drive their engagement reveals several key insights. Among users who strongly agreed that the recharge system and its bonuses make it easier to access rides and encourage continued use, the majority 99 respondents identified "Bonus on recharge" as the most

motivating strategy. This indicates a strong preference for simple, direct incentives among highly satisfied users. Similarly, 88 respondents who agreed with the effectiveness of the recharge system were most motivated by "Challenges", suggesting that interactive elements also play a crucial role in maintaining engagement. Interestingly, even among users who strongly disagreed with the recharge system's value, 11 respondents still found "Challenges" to be their primary motivator, and tow respondents in this group were most motivated by "Ranking and rewards, challenges", highlighting that even disengaged users can be drawn in by competitive or recognition-based elements. In contrast, strategies combining multiple features such as "Bonus on recharge, challenges, ranking and rewards" were less favored overall, with only tow respondents from the strongly agree *g*roup selecting it. Furthermore, 20 respondents who agreed with the recharge system's value identified "Ranking and rewards" as their top motivational strategy, reinforcing the importance of social recognition and achievement for a significant segment of users. Overall, the findings suggest that straightforward reward mechanisms like recharge bonuses are the most effective motivators for users who already view the system positively, while challenge-based and ranking-oriented strategies offer broader but more segmented appeal.

3.3.1. Chi-Square Test

- H0 (Null hypothesis):

  There is no significant relationship between the recharge system and its bonuses making it easier to access rides and encouraging continuation, and which strategy motivates theme the most.

- H1 (Alternative hypothesis) :

  There is a significant relationship between the recharge system and its bonuses making it easier to access rides and encouraging continuation, and which strategy motivates me the most.

Table N°10 : Chi-Square Test Results (H3)

Chi-square statistic (χ^2)	12.17
p-value	0.032
Significance level (α)	0.05 (5 %)

Source : Developed by the researcher using XLSTAT

Because $p = 0.032 < 0.05$, the association is statistically significant at the 5 % level.

The Chi-square test indicates a statistically significant relationship at the 5% significance level between the recharge system (and its associated bonuses) facilitating access to rides and encouraging continuation, and the strategy that most motivates drivers. With a Chi-square statistic of 12.17 and a p-value of 0.032 (which is below the 0.05 threshold), the null hypothesis is rejected.

3.4. Discussion of Results

The cross-analysis of drivers' perceptions regarding financial incentives versus behavioral structuring reveals a nuanced motivational landscape. Notably, 90 drivers agreed that the bonus system helps organize their day but disagreed that financial rewards are their primary motivator. This suggests that the structuring effect of the bonus system, its ability to impose routine and clarity can drive engagement independently of actual monetary gain. An even more pronounced example emerges with 81 drivers who strongly agreed that bonuses structure their day while strongly disagreeing that money is their main motivator. Such a pattern points toward intrinsic or habit-forming factors , perhaps the satisfaction of goal completion or the predictability introduced by the system aligning with theories of self-determination that emphasize autonomy and competence over extrinsic rewards.

In contrast, a group of 35 drivers demonstrated clear incentive-driven behavior by strongly agreeing that both the bonus system structures their day and financial rewards are their main driver. This segment aligns with classical economic models of worker behavior, where compensation is the direct lever of engagement. At the other extreme, very few drivers exhibited

either complete rejection or ambivalence: only six drivers strongly disagreed with both statements, and three drivers were neutral about the bonus system yet strongly motivated by money. The rarity of these profiles underscores that misalignment between structural reinforcement and financial motivation is uncommon among the driver population.

The second cross-analysis investigated the interplay between practical in-app guidance and gamified design features. Here, 153 drivers agreed that notifications aid their planning and simultaneously valued gamification as enhancing their motivation and satisfaction. This strong co-occurrence suggests that helpful, context-sensitive prompts prime users to embrace gamified elements, potentially because both features deliver timely feedback and a sense of progression. A subgroup of 69 drivers who **s**trongly agreed on both counts further illustrates how effective guidance can deepen engagement, these drivers likely experience compounded benefits from real-time objectives paired with reward structures that validate their efforts.

Conversely, outright rejection of both guidance and gamification was rare only two drivers strongly disagreed with both features, and one driver remained neutral on each while 12 drivers expressed skepticism by disagreeing with notifications and strongly rejecting gamification. This small, disengaged cohort may resist digital nudges or find neither structural nor playful elements appealing, warranting tailored user-experience strategies should the platform aim to re-engage them.

Finally, the Chi-square test ($\chi^2 = 5.48$, $p = 0.064$) demonstrates a statistically significant association at the 10% level between attention to notifications/objectives and heightened engagement in the gamified system. Thus, drivers who leverage planning tools appear to derive greater motivational and satisfiability benefits from gamification than they would in a non-gamified context. Practically, this indicates that gamification extends beyond "fun" features; it interacts synergistically with functional elements (like prompts and goal-setting), fostering a more dynamic and controlled work experience. As such, designers should consider integrating gamified feedback loops within core operational tools to maximize both usability and engagement.

In simpler terms, this means that drivers who see the recharge system as a helpful tool for getting more rides and staying active on the app tend to be motivated by specific strategies more than others. Whether it's financial rewards, performance goals, or ease of access, the way the recharge system is designed clearly plays a role in what keeps drivers engaged and coming back. It highlights how important it is to align platform features with what actually motivates users on a day-to-day basis.

General Conclusion

General Conclusion

Gamification is the integration of game-like mechanics and dynamics into non-game contexts, has emerged in recent years as a key strategy for boosting motivation and strengthening user engagement. From early behavioral theories to more recent insights from cognitive science, gamified systems have shown their ability to capture attention, encourage repeat use, and create a sense of achievement. Across many sectors, from education and healthcare to marketing and mobility apps, the use bonus after X, Ranking and rewards, personalized notifications, and symbolic or monetary rewards proves that, when thoughtfully designed, these tools can drive active participation, extend usage time, and build user loyalty. Ultimately, the overall impact of gamified systems is a positive transformation of the user experience, provided the target audience is well understood, the right tools are chosen, and the challenges and limits of implementation are carefully considered.

Throughout the theoretical work, we highlighted the complexity of this field. The constituent elements, such as badges, leaderboards, notifications, and reward loops, must be selected according to the objectives pursued and the audience: some users are more motivated by the feeling of personal progress, others by social challenge or peer recognition. Furthermore, the analysis of available tools (specialized platforms, Loyalty Tools) emphasizes the necessity of flexible technical integration and an iterative design process to avoid overwhelming users with overly repetitive or ill-suited stimuli. The limitations emerge when gamification, poorly calibrated, becomes a mere “reward arms race” and ends up diluting the experience or even demotivating the very people it aimed to engage.

When measuring how gamification influences engagement, we relied primarily on three data types. Physiological measurements could, in future studies, capture real- time emotional reactions to gamified features, revealing excitement or stress that drivers might not consciously report. web analytics measurements (time spent in the app,completion rates for in- app challenges) quantify actual behavior over time, showing whether participants keep returning, how long they stay engaged, and whether they complete goals.

Finally, Self-report measurements collected through telephone interviews with 494 drivers, allowed us to directly address our hypotheses. In these interviews, drivers rated how much they

agreed or disagreed with statements about ranking and rewards, Bonus on recharge, and the Challenges feature, and then identified which element they felt was most motivating.

from the last measurement we were able to confirm our three core hypothesis:

- H1 (Drivers who agree that bonuses help structure their day are more likely to declare financial bonuses as their main motivation) was partially confirmed, a χ^2 test revealed a significant association between perceiving bonuses as structuring and selecting financial bonuses as the primary motivator.
- H2 (A higher level of agreement on the usefulness of notifications is associated with a higher level of personal satisfaction from goals and rewards) was confirmed: drivers who rated notifications as useful also reported higher satisfaction with reaching goals and earning rewards.
- H3 (Perceiving the recharge system as encouraging continued use increases the odds of selecting "bonus on recharge" as the most motivating strategy) was confirmed: drivers who felt that this system incentivized continued use overwhelmingly chose "bonus on recharge" as their top motivator.

Together, these results answer our core question: gamification elements in Heetch's app have a measurable, multi-dimensional impact on driver engagement, structuring behavior, fueling motivation, and fostering emotional satisfaction.

Recommendations

✓ While Heetch has begun to experiment with gamified features, our findings show that a truly holistic approach, one that intentionally designs around five key dimensions is essential. At present, these dimensions are not fully leveraged; integrating them will deepen engagement and ensure that every aspect of the driver experience is optimized.

Cognitive Dimension

To enhance the cognitive dimension, implement in-app dashboards and progress bars that visually track drivers' goals and remaining targets. Complement these visuals with concise

tutorials or tooltips that explain the function of each gamified element, how badges are earned, or how bonus on recharge accumulates.

By presenting information in a structured, easily digestible format, drivers can form accurate mental models of the reward system and anticipate their next milestones. This clarity is crucial: as evidenced by our bivariate analysis (H2), drivers who understand cognitively how close they are to a reward report higher satisfaction. Even well- designed incentives can lose traction, as users may fail to perceive their own progress or misinterpret the rules governing rewards.

Emotional Dimension

In the emotional dimension, introduce recognition features that provoke positive affect and a sense of achievement. For example, award digital badges upon reaching specific thresholds, such as "100 trips completed" and accompany these with brief "achievement unlocked" animations or congratulatory messages ("Great job! Only two more rides to unlock today's bonus!"). Such celebratory cues operate on an affective level, tapping into drivers' intrinsic desire for acknowledgment and social validation. In practice, these affective reinforcements transform routine tasks into moments of pride, reinforcing long- term loyalty beyond purely financial incentives.

Accessibility Dimension

For the accessibility dimension, ensure that all gamified features remain reachable and interpretable under diverse driving conditions and device capabilities. Use universally recognizable icons (e.g: a trophy for achievements, a bell for notifications), large legible fonts, and a color palette with strong contrast, so that drivers can quickly understand their status at a glance, even while en route. Additionally, implement offline caching of progress data so that, in areas with poor or no network coverage, drivers can still view their current standings and upcoming targets. Accessibility is paramount: if a driver cannot access or comprehend a gamified element, because the interface is cluttered, the text is too small, or connectivity drops, the motivational value is effectively nullified. Designing with accessibility in mind guarantees that every driver, regardless of their smartphone model or signal strength, reaps the benefits of gamification.

General Conclusion

✓ Add Recognition Mechanics: Introduce digital badges, leaderboards, or "driver of the week" shout-outs to tap into drivers' pride and community spirit.

Next Steps for Heetch

✓ Audit Current Features: Map existing gamification elements against these five dimensions to identify gaps.

✓ Co-Design Workshops: Engage a small group of drivers in testing new prototypes for dashboards, badges, and tiered bonuses.

✓ Iterate and Measure: Roll out updates incrementally, using A/B testing to measure the impact on engagement metrics (e.g., average rides per day, app session length).

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Annexes

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- **<u>Annexe N °1:</u>** Telephone Interview Sheet (Drivres)

On average, how many hours per day do you work with this application?	The notifications and objectives displayed in the application help me better plan my routes.	Financial incentives and bonuses are my main source of motivation for using the application.	Gamification significantly increases my engagement, motivation, and satisfaction compared to a non-gamified system.	The bonus system (e.g., bonus after X trips) pushes me to organize my day to maximize my earnings	The recharge system and associated bonuses make it easier for me to access rides and encourage me to continue.	The ranking of the best drivers and the rewards motivate me to improve my performance.	Among the following strategies, which motivates you the most?
3h -6h	neutral 3	strongly disa	agree 2	strongly agre	agree 2	agree 2	Bonus on recharge, Ranki
3h -6h	strongly agre	disagree 4	strongly agre	strongly agre	strongly agre	strongly disagre	Bonus on recharge
more than 6h	strongly agre	strongly disa	strongly agre	agree 2	strongly disa	agree 2	challenges
3h -6h	strongly agre	strongly disa	disagree 4	disagree 4	agree 2	strongly disagre	Bonus on recharge, challe
more than 6h	agree 2	strongly disa	agree 2	strongly agre	strongly agre	strongly agree	Bonus on recharge
more than 6h	agree 2	agree 2	agree 2	agree 2	strongly agre	neutral 3	challenges, Bonus on recl
3h -6h	agree 2	strongly disa	strongly agre	agree 2	strongly agre	agree 2	challenges, Bonus on recl
3h -6h	strongly disa	neutral 3	neutral 3	neutral 3	neutral 3	neutral 3	neutral
more than 6h	agree 2	strongly disa	neutral 3	disagree 4	strongly agre	agree 2	Bonus on recharge, challe
3h -6h	agree 2	disagree 4	agree 2	strongly agre	disagree	agree 2	challenges
3h -6h	agree 2	disagree 4	agree 2	agree 2	agree 2	strongly agree	challenges

- **<u>Annexe N °2:</u> Questions for Driver Telephone Interview**

1- On average, how many hours per day do you work with this application?

- Less than 3h
- 3h-6h
- More than 6h

2- The notifications and objectives displayed in the application help me better plan my routes.

- Strongly Agree
- Agree

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- Neutral
- Disagree
- Strongly Disagree

3- The bonus system (e.g., bonus after X trips) pushes me to organize my day to maximize my earnings

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

4- Gamification significantly increases my engagement, motivation, and satisfaction compared to a non-gamified system

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

5- Financial incentives and bonuses are my main source of motivation for using the application.

- Strongly Agree
- Agree

Annexes

- Neutral
- Disagree
- Strongly Disagree

6- The recharge system and associated bonuses make it easier for me to access rides and encourage me to continue

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

7- The ranking of the best drivers and the rewards motivate me to improve my performance.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

8- Among the following strategies, which motivates you the most? (multiple choice)

- Bonus on recharge
- Challenges
- Ranking and rewar