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How Gamification creates Brand Awareness among International Users: Duolingo Case Study

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October, 2024

Department of Marketing, Strategy and Operations

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Resumo

Num cenário cada vez mais digital, onde a concorrência em vários setores está a intensificar-se, as empresas procuram constantemente estratégias inovadoras para se diferenciarem e envolverem os utilizadores. Uma dessas estratégias que tem conquistado destaque é a gamificação—o uso de elementos de jogos em contextos não relacionados com jogos para melhorar a experiência do utilizador, aumentar o envolvimento e impulsionar comportamentos desejados. À medida que as organizações adotam a gamificação para se conectarem com o seu público, o seu impacto no envolvimento e na consciência da marca torna-se uma área crítica de exploração. Este estudo tem como objetivo investigar como a gamificação influencia a brand awareness (consciência de marca) entre utilizadores internacionais, usando o Duolingo como estudo de caso. A revisão da literatura oferece uma análise abrangente das pesquisas teóricas existentes, introduzindo o conceito de gamificação, distinguindo-a dos jogos tradicionais e explorando as suas vantagens, desvantagens, e as suas ligações com o envolvimento e a consciência de marca feitas por outros autores. Além disso, fornece uma visão de como o Duolingo utiliza estratégias de gamificação para melhorar a interação do utilizador. O modelo conceptual e as hipóteses foram criadas com base na investigação feita na pesquisa teórica. A parte empírica deste estudo foi conduzida através de questionários online, e a análise Partial Least Squares (PLS) foi utilizada para avaliar as respostas do inquérito. Os resultados mostram que, embora características de gamificação como elementos imersivos e cognitivos impactem certas dimensões do envolvimento com a marca, elas não influenciam a consciência da marca. Por outro lado, os resultados revelaram um impacto significativo das características de gamificação social tanto no envolvimento com a marca quanto na consciência da marca.

Palavras-chave: Gamificação, Envolvimento com a Marca, Conscientização de Marca, Duolingo

Classificação JEL:

M30 Marketing Geral

M37 Publicidade

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Abstract

In today's increasingly digital landscape, where competition across various sectors is intensifying, companies are constantly seeking innovative strategies to differentiate themselves and engage with users. One such strategy gaining prominence is gamification—the use of game-like elements in non-gaming contexts to enhance user experience, increase engagement, and drive desired behaviors. As organizations adopt gamification to connect with their audience, its impact on brand engagement and awareness becomes a critical area of exploration. This study aims to investigate how gamification influences brand awareness among international users, using Duolingo as a case study. The literature review offers a comprehensive examination of existing theoretical research, introducing the concept of gamification, distinguishing it from traditional games, and exploring its advantages, disadvantages, and its connections to brand engagement and awareness made by other authors. Additionally, it provides insights into how Duolingo employs gamification strategies to enhance user interaction. The conceptual model and hypotheses were created based on the investigation made in theoretical research. The empirical part of this study was conducted through online surveys. Partial Least Squares (PLS) analysis was used to evaluate the survey responses. The results show that although gamification features such as immersive and cognitive elements impact certain dimensions of brand engagement, they do not influence brand awareness. On the other hand, the findings revealed a significant impact of social gamification features on both brand engagement and brand awareness.

Keywords: Gamification, Brand Engagement, Brand Awareness, Duolingo

JEL Classification System:

M30 Marketing General

M37 Advertising

TABLE OF CONTENTS

CHAPTER 1	1
1.1 INTRODUCTION TO THE TOPIC	1
1.2 RESEARCH OBJECTIVES AND QUESTIONS	2
1.3 STRUCTURE OF THE DOCUMENT	3
CHAPTER 2	5
2.1 GAMIFICATION	5
2.2 GAMES VS GAMIFICATION	6
2.3 ADVANTAGES OF GAMIFICATION	9
2.4 DISADVANTAGES OF GAMIFICATION	10
2.5 GAMIFICATION AND BRAND ENGAGEMENT	12
2.6 BRAND ENGAGEMENT AND BRAND AWARENESS	13
2.7 DUOLINGO	14
2.7.1 HOW TO START	15
2.7.2 DUOLINGO FEATURES	15
2.7.3 GAMIFICATION IN DUOLINGO	16
CHAPTER 3	19
3.1 CONCEPTUAL MODEL AND HYPOTHESIS	19
CHAPTER 4	25
4.1 METHODOLOGY	25
4.2 RESEARCH APPROACH	25
4.3 DATA COLLECTION	26
4.4 QUESTIONNAIRES' DESIGN	26
4.5 DATA ANALYSIS	27
CHAPTER 5	29

RESULTS AND FINDINGS	29
5.1 SAMPLE CHARACTERISTICS	29
5.2 MODEL ANALYSIS	30
5.3 STRUCTURE MODEL ANALYSIS	33
5.4 HYPOTHESIS DISCUSSION	38
 CHAPTER 6	 43
 CONCLUSION	 43
6.1 FINAL CONCLUSIONS	43
6.2 MANAGEMENT IMPLICATIONS	44
6.3 LIMITATIONS AND FUTURE RESEARCH RECOMMENDATIONS	45
 REFERENCES	 47
 APPENDIXES	 51
 APPENDIX A. QUESTIONNAIRE	 52
APPENDIX B. PATH MODEL (SMART PLS 4 RESULTS)	53

TABLE OF CONTENTS – TABLES

Table 2.1 Gamification definition -----	6
Table 2.2 MDA Framework according to Kim (2015) -----	9
Table 4.1 - Sources of measurement for variables used on the survey -----	27
Table 5.1 Sample Characteristics -----	30
Table 5.2 Validity and Reliability measurement (n=100) -----	31
Table 5.3 Fornel and Larcker's method -----	32
Table 5.4 Cross-Loadings -----	33
Table 5.5 VIF (Variance Inflation Factor) -----	34
Table 5.6 R-square -----	34
Table 5.7 f^2 -----	35
Table 5.8 Model Results -----	36
Table 5.9 Hypothesis validation -----	37

TABLE OF CONTENTS – FIGURES

Figure 2.1 Screenshots of Duolingo App – How to start -----	15
Figure 2.2 Screenshots of gamification features on Duolingo -----	17
Figure 3.1 Conceptual Model -----	20
Figure 5.1 PLS Results Structure Model -----	38

CHAPTER 1

1.1 Introduction to the topic

Over the past several years, gamification has emerged as a highly promising and innovative trend across a diverse range of fields, including corporate management, resource planning, healthcare, marketing, and the development of loyalty programs (Koivisto & Hamari, 2019). Its application has gathered significant attention due to its potential to drive user engagement and foster desired behaviors in various contexts, particularly within service-oriented industries.

Gamification has shown substantial success in increasing user participation, facilitating social interaction, and enhancing the overall quality and productivity of actions taken by users within a service (Hamari et al., 2014). At its core, gamification refers to the integration of game-like elements, such as points, badges, and leaderboards, into non-gaming activities with the objective of motivating and influencing behavior (Chapman, 2011). A growing number of organizations are leveraging gamification to improve a variety of outcomes, including employee productivity, workplace safety, and customer engagement, making it an increasingly valuable tool in corporate strategy (Chapman, 2011). As a result, the exploration and implementation of gamification strategies have become a key focus for many companies, seeking to enhance their operations and achieve targeted outcomes.

Despite its growing prominence in the corporate sector, the academic research surrounding gamification remains relatively limited, particularly in terms of its potential to create brand awareness among international audiences. This thesis aims to address this gap by critically investigating and evaluating whether companies can leverage gamification as a strategy to enhance brand awareness on a global scale. Through an analysis of gamification's strategic use, this study will explore its effectiveness in building brand awareness, engaging international users, and supporting companies in their efforts to reach and resonate with diverse markets.

To achieve the objectives of this study, Duolingo was selected as a case study, and an analysis was conducted using the Smart PLS software. The findings revealed that gamification features—specifically Immersion, Achievement, and Social—each have varying effects on different dimensions of brand engagement. However, the results show that only the Social features significantly impact the social dimension of brand engagement, which in turn has a positive influence on Duolingo's brand awareness. This suggests that while several gamification elements enhance user engagement, it is the social interaction components that contribute most to building brand recognition.

1.2 Research Objectives and Questions

In an increasingly digital world, we are constantly surrounded by a growing range of choices across various sectors. What sets brands apart in this competitive landscape is the strategy they adopt to remain relevant and engage meaningfully with their audience. Gamification, which seamlessly blends the digital environment with innovative brand strategies, has emerged as a powerful tool for companies to stand out. It offers an interactive and engaging way to capture users' attention, driving both participation and loyalty.

This study focuses on understanding how gamification, as a strategy, influences brand awareness, particularly among international users. By exploring how gamification enhances user experience and fosters deeper connections with brands, the aim is to shed light on how these elements can boost brand recognition and create lasting impressions in a global market. In essence, the research explores into how gamification can be the key to making brands more recognizable and memorable in today's digital era.

This study aims to answer the following questions:

1. To achieve brand awareness through gamification what aspects needs to be considered?
2. Are gamification features, such as immersion, achievement, and social, relevant to create brand engagement?
3. Are brand engagement behaviors, such as emotional, cognitive and social, relevant to create brand awareness?
4. Which gamification components are more relevant to create brand engagement and brand awareness?

1.3 Structure of the document

Chapter I: Introduction to the topic, research objectives, and questions. This chapter also presents the structure of the document.

Chapter II: Literature review. This chapter analyzes theoretical research on the topic, introducing the concept of gamification, the difference between gamification and games, the advantages and disadvantages of gamification, the link between gamification and brand engagement, the connection between brand engagement and brand awareness, and finally, a presentation of Duolingo and how it uses gamification.

Chapter III: Conceptual model and hypotheses. This chapter explains the model used to achieve the study's objectives and presents the hypotheses, detailing the correlations between them.

Chapter IV: Methodology. This chapter outlines the methodology used to analyze the research objectives, the questionnaire design, and the software employed to analyze the findings.

Chapter V: Results and Findings. This chapter presents the results and findings of the research model, providing a detailed analysis to ensure the quality of the results. At the end, an overall conclusion is provided for each hypothesis.

Chapter VI: This final chapter presents the overall conclusions of the study, including management implications, limitations, and suggestions for future research.

CHAPTER 2

2.1 Gamification

Similar to games, gamification offers enjoyable activities to engage in, accompanied by a set of rules to adhere to (Kim 2015). Additionally, the author explains that the level of technology required for gamification can vary widely, ranging from none at all to simple or advanced levels of technological integration.

Although there are some similarities between games and gamification, the terms are not exactly the same (Kim 2015). The term of Gamification was created by Nick Pelling in 2005, and as the term suggest is not the creating of a new game but transferring game characteristics to something that it is not a game, thus “gami-fy-ing” (Kim B. 2015).

Additionally, Kim (2015) and Deterding et al. (2011) mention the term is described as “fun” in order to engage the “players” in the activity. Gamification holds great promise in transforming ordinary customers into enthusiastic fans, mundane tasks into enjoyable experiences, and educational endeavors into engaging and pleasurable activities (Burke, 2014).

Zicherman and Cunningham (2011) and Robson et al., (2015) explained that gamification is a different way of thinking in order to create game rules to increase the customer loyalty. Additionally, Zicherman and Cunningham (2011) mentioned that gamification is the act of transferring game activities in something that is not considered a game.

Other authors suggest that Gamification is a term used to described game elements and mechanics in non-gaming activities (Ismail et al., 2018). It utilizes game mechanics and design elements to address real-world business problems and engage users (Battur and Kandagal, 2022). Hamari et al. (2014), states that gamification aims to provide game experiences and behavioral responses using game features in order to capture the same psychological experiences that games provide. Additionally, Hamari, et al. (2014) mention that the gamification is the use of game characteristics and design in non-gaming activities, with the objective of create a desire in users.

A more recent study mentioned that gamification involves creating designs and experiences that mimic the positive aspects of games to influence user behavior and cognitive processes (Koivisto and Hamari, 2019). The authors also mention that drawing inspiration from games, gamification often incorporates game mechanics into various aspects of business, such as services, products, advertisements, and websites. By integrating features like challenges, rewards, competitions, and socialization, gamification aims to boost user participation, engagement, and loyalty in these contexts (Koivisto and Hamari, 2019). Additionally,

according to Battur and Kandagal (2022) gamification can provide valuable insights into customer behavior and help organizations improve their practices and identify new marketing opportunities. Huotari and Hamari (2012) discuss that it is important to mention that gamification has a purpose to offer a service with vibrant characteristics in order to provide gaming experiences increasing the customers' motivation to enjoy the service and possibly engage new customers. The table above (Table 2.1) demonstrate some definitions of gamification according to some authors.

Table 2.1 Gamification definition

Definition	Authors
"the use of game design elements in non-game contexts"	Deterding et al. (2011)
"In matter of gamification we are talking about the design elements of gaming"	Asaj et al. (2012)
"Gamification is a popular method for increasing user engagement with an attractive system that uses elements of games and game design techniques in non-game fields"	Permana et al.
"Gamification refers to the design that attempts to bring about similar positive experiences as games do, and consequently affect user behavior and cognitive processes"	Xi and Hamari (2019)
"is the process of defining the elements that comprise games, making those games fun, and motivating players to continue playing, and then using those same elements in a non-game context to influence behavior"	Abadi et al., (2022)

2.2 Games vs Gamification

Kim (2015) state that the computer and video gaming industry is massive and incredibly popular globally. Additionally, affirmed that by 2015, it was projected to be worth \$111 billion, driven by strong sales in mobile gaming, consoles, and software. Over 1.2 billion people were expected to play games on various devices, which is about 17% of the world's population. Remarkably, a significant number of people spend a substantial amount of time gaming (Kim 2015).

To understand the antecedents and motivations of users' engagement it is fundamental to comprehend the appropriate design of game mechanisms to increase the impacts (Hamari, et al. 2014).

Bunchball (2010) explains that in gamification, two terms commonly used and closely related are game mechanics and game dynamics. Andrade (2016) mentioned that game mechanics refer to the various actions, rules, and benefits that make up a game, behaviors and control mechanisms used to gamify an activity, incorporating elements that make the experience more challenging, fun, rewarding, or capable of evoking other desired emotions. On the other hand, game dynamics are related to universal human needs and desires that transcend location, age, gender, or culture (Andrade, 2016). Moreover, Kim (2015) adds the term of games' aesthetic, explaining the MDA (mechanics, dynamics, and aesthetics) Framework, which offers a structured method for comprehending games, serving as a valuable model for understanding the mechanics of gamification:

MDA Framework according to Kim (2015):

Game Mechanics: Game mechanics encompass the range of actions, behaviors, and control mechanisms available to players within the context of a game. For instance, in card games, mechanics such as shuffling, trick-taking, and betting are fundamental elements that contribute to gameplay dynamics, such as bluffing. Zichermann and Cunningham (2011), describe game mechanics as they are established prior to the game's commencement, maintaining consistency across all players, and serving as the operational elements of the game.

Furthermore, in gamification, mechanics pertain to aspects such as player advancement, tasks, controls, and features (Kusuma et al. 2018). One common mechanic is points, which signify a player's progress. Players earn points based on their actions, and accumulating a certain number of points allows them to unlock achievements for their character. Kusuma et al. (2018) conclude that points can also be compared with those of other players, creating a leaderboard to highlight the top performers.

Game Dynamics: In the MDA model explained by Kim (2015), dynamics represent the fundamental design principles within a game that contribute to the overall aesthetic experience for players. These dynamics serve to create and enhance specific aesthetic qualities that players encounter during gameplay. For instance, dynamics like time pressure and opponent interaction contribute to the sense of challenge within the game, making it more engaging and rewarding for players. Similarly, dynamics such as team communication and cooperative objectives promote a sense of fellowship among players, encouraging collaboration and mutual support. Zichermann and Cunningham (2011) and Werbach and Hunter (2012). state that dynamics

serve as the means through which users engage with the experience by interacting with the mechanics adopted by players. Kusuma et al. (2018) also defends the MDA Model, saying that the most common type of dynamic are rewards. According to Kusuma et al. (2018) rewarding users for their achievements can significantly boost their motivation, encouraging them to continue their efforts and strive for further progress. Another effective dynamic in education is role-playing, where consumers take on specific characters or roles within a scenario, enhancing engagement and immersion. Non-linear progression allows users to advance through learning tasks in various ways, promoting flexibility and personalization in their learning journey.

These dynamics can be combined to create more engaging and diverse learning experiences. For example, consumers may role-play as characters while exploring a game-related world, participating in activities of their choice without a set order, and receiving rewards upon completion. Additionally, hints can be provided to support players, especially those who are new to gaming or unfamiliar with similar educational activities, facilitating their learning process.

Game Aesthetic: Lastly, Kim (2015) mention that within the realm of aesthetics in gaming, there are various categories that encompass different goals and elements of enjoyment. These include sensation, which focuses on the pleasure derived from engaging the senses; fantasy, where players immerse themselves in make-believe worlds; narrative, which involves storytelling and drama within the game; challenge, where players overcome obstacles and face difficulties; fellowship, which emphasizes social interaction and community within the game environment; discovery, which involves exploring uncharted territories and uncovering new experiences; expression, where players engage in self-discovery and creativity; and submission, where gaming serves as a form of leisure or relaxation. These aesthetics represent the diverse aspects of fun and fulfillment that games can provide.

In conclusion, according to Kim (2015), the MDA model is valuable because it enables us to understand both the perspectives of game designers and players simultaneously. For players, game mechanics represent the rules of the game, while dynamics shape the overall gaming experience. In contrast, designers view mechanics as player actions and controls, while dynamics are seen as the principles guiding the interaction between mechanics and players. Aesthetics, the ultimate goal of gameplay for players, are the emotional responses designers aim to evoke through the use of mechanics and dynamics. In essence, the MDA model provides a comprehensive framework for analyzing games from both design and player perspectives.

Table 2.2 MDA Framework according to Kim (2015)

MDA	Definitions	Examples
Mechanics	“Mechanics refers to the various actions, behaviors, and control mechanisms afforded to the player within a game context”	“card games include shuffling”; “trick-taking”; “betting”
Dynamics	“Dynamics in the MDA model are the game design principles that create and support aesthetic experience”	“time pressure”; “opponent play”
Aesthetics	“Sensation (game as sense-pleasure), fantasy (game as make-believe), narrative (game as drama), challenge (game as obstacle course), fellowship (game as social framework), discovery (game as uncharted territory), expression (game as self-discovery), and submission (game as pastime)”	

2.3 Advantages of Gamification

As mentioned above, over the past years more and more industries have been use gamification as a strategy to boost users’ excitement and engagement. Nacke et al. (2013) mention that the one of the most important aspect and benefit from gamification is socialization.

According to Abadi et al. (2022) the benefits of gamification lie in two psychological theories: the Theory of Flow, and the Self-determination theory.

The self-determination theory proposes that individuals are driven to develop and evolve by three fundamental psychological needs that are inherent and universal. According to this theory, individuals achieve a sense of self-determination when their needs for competence, connection, and autonomy are satisfied (Abadi et al. 2022). Furthermore, the Self-Determination Theory suggests that intrinsic motivation leads to more effective learning, thus supporting the validity of this sequence model (Dickinson, 1995).

Moreover, Abadi et al. (2022) explains the Flow theory as characterized as an optimal state of experience where individuals are fully immersed and focused in an activity, is considered a significant psychological outcome of both gamification and games. Designers utilize the flow theory to better understand users' engagement levels. According to this theory, individuals enter a state of flow when they are faced with challenging tasks that they feel

capable of handling, resulting in a sense of captivation, happiness, and eagerness (Kankanhalli et al., 2012). Game elements like scoreboards, rewards, quests, teamwork, and leadership roles contribute to fulfilling essential psychological needs. Consequently, gamification has the potential to enhance students' engagement by facilitating flow experiences (Abadi et al., 2022; Kankanhalli et al., 2012).

These two theories directly relate to the key gamification features—Immersion, Achievement, and Social Interaction (Ryan and Deci, 2000). Immersion features align with the Flow Theory, as they are designed to engage users in a way that fully absorbs their attention, creating an environment where they can lose themselves in the task at hand (Xi and Hamari 2020). Achievement features tie into the Self-Determination Theory by fostering a sense of competence and progress, motivating users through goals, rewards, and accomplishments (Xi and Hamari, 2020). Finally, Social Interaction features address the need for connection, another core aspect of Self-Determination Theory, by enabling users to engage with others, share their progress, and compete or collaborate within a community (Abadi et al., 2022; Kankanhalli et al., 2012). Together, these features help create a holistic gamified experience that meets users' psychological needs while driving engagement and brand loyalty.

2.4 Disadvantages of Gamification

On other hand, gamification can have its' disadvantages as well. The primary drawback of gamification is its temporary nature (Nicholson, 2014). The author explains that as users engage with a service over time, they gain expertise and familiarity, potentially diminishing the effectiveness of gamification. Research indicates that extended use of gamified applications may lead to reduced impact on users over time (Koivisto, Hamari, 2019). According with Abadi et al., (2022) there are a set of implications by using gamification, such as, costly to create; decreased worth as time progresses; games disguised as quizzes with poor execution; “pointsification”; competition; cheating; frustration; evaluating the impact or effectiveness. Below are these topics described according to Abadi et al., (2022).

Costly to create: A commonly held belief is that implementing this type of technology can be costly. Developing games requires more time compared to traditional instructional design methods. Poorly designed games may negatively impact students' attitudes. Time is a valuable resource, and there's a risk of exceeding budgets due to the increased time demands. Additionally, enhancing gameplay with animations, graphics, stock media, music, and sound

effects adds to the expenses. Gamifying learning scenarios incurs extra costs, including purchasing games and ensuring that system specifications are compatible with the games.

Decreased worth as time progresses: Games not only require significant initial investment but also entail ongoing maintenance costs. Over time, even the most cutting-edge games can quickly become outdated, raising concerns among users about the relevance of the content. Additionally, games typically have limited replay value, meaning that once users have completed them, they may be reluctant to revisit the material for reference purposes. As a result, supplementary resources such as quick reference guides may need to be developed alongside the game, further adding to the overall project expenses.

Games disguised as quizzes with poor execution: Games are inherently designed to be enjoyable, unlike quizzes or tests which are often seen as mundane tasks. Developing interactive and engaging games that don't feel like disguised quizzes requires creativity and effort. Assessments within games should align with the learning objectives just like any other eLearning content. While collecting points or stars may not sufficiently motivate adult learners, tokens, badges, or in-game rewards need to hold significance for them. Successfully overcoming workplace challenges presented in an eLearning course can be highly motivating. Real-life scenarios, situations, and job-related challenges are more effective than traditional quizzes and tests in engaging learners and facilitating learning.

“Pointsification”: Several studies have indicated that badges, competitions, leaderboards, and points—common game design elements—can sometimes lead to negative outcomes. The most frequently mentioned negative effects include ineffectiveness, lack of comprehension, irrelevance, motivational challenges, and decreased performance. Additionally, ethical concerns such as gaming the system and cheating were commonly reported in these studies.

Competition: Introducing gaming elements into training scenarios often fosters a sense of competitiveness among participants. While competition can be beneficial within gaming contexts, organizations typically emphasize the importance of cooperation among employees.

Cheating: Another concern raised is the risk of cheating within games, particularly in educational settings. With minimal barriers, students may resort to searching the internet or seeking answers elsewhere. If games serve as the sole method of evaluation, distinguishing between a student's actual knowledge and information obtained externally becomes challenging. This issue is exacerbated by the evolving educational landscape, where gaming and the desire to win may further incentivize cheating behaviors among students.

Frustration: According to experts, the utilization of gamification methods in learning can result in a reduction of learners' attention spans. Furthermore, if learners do not receive immediate gratification in real-life situations, it may lead to feelings of frustration.

Evaluating the impact or effectiveness: Certain researchers argue that the recent emergence of gamification has not undergone thorough testing, as there has not been adequate time to assess its long-term impacts.

2.5 Gamification and Brand Engagement

Brand engagement refers to a complex psychological state that arises from interactions with a brand (Xi and Hamari, 2019; Xi and Hamari, 2020). Additionally, the authors explain that it encompasses emotional, cognitive, and social aspects of engagement. According to numerous authors Brand engagement arises from collaborative customer experiences, where consumers interact with the brand's offerings and representatives, shaping their unique relationships with the brand (Xi and Hamari, 2020; Brodie et al., 2011; Hollebeek et al., 2014). Additionally, customer engagement is the way users actively interact and show interest in a company, brand, or product. It involves a company's efforts to encourage and inspire customers to participate, while also tracking and measuring their level of involvement (Ting et al., 2020)

Gamification strategies implemented by different brands have numerous effects, including influencing customer engagement (Xi and Hamari 2019; Xi and Hamari, 2020). Customer brand engagement refers to the connection and interaction between users and brands (Permana, et al., 2021). Furthermore, engagement is also connected with gamification, since more and more organizations are benefiting from the use of gamification as a strategy to create customer loyalty and, in thus, create customer engagement (Hamari, 2013).

So et al., (2014) stated that Emotional brand engagement refers to the positive emotional responses that users develop when interacting with a brand. This includes feelings of enthusiasm, excitement, or affection toward the brand, which are often driven by personalized or immersive experiences. When companies employ gamification, features like rewards, storytelling, or interactive design create emotional connections that foster loyalty and a deeper attachment to the brand. Emotional behavior is fundamental in keeping users invested and engaged with the brand over time. As consumers feel emotionally rewarded, they are more likely to continue interacting with the brand, leading to stronger customer loyalty (Hollebeek et al., 2014).

Cognitive brand engagement involves the mental processes that occur when individuals interact with a brand. It refers to how much attention, focus, and mental energy a user dedicates to brand-related activities (Vivek et al. 2014). Xi and Hamari (2020) explained that gamification leverages cognitive behavior by providing goal-oriented tasks, challenges, and achievements that encourage users to think critically and invest their mental resources. For instance, leaderboards, badges, and progress tracking engage users' cognitive faculties, driving their attention toward mastering tasks and achieving goals within the platform. Cognitive engagement thus not only deepens users' understanding of the brand but also enhances their involvement through consistent intellectual stimulation (Xi & Hamari, 2020).

Social brand engagement centers around how users interact with others in relation to the brand, including peer interaction, community engagement, and social sharing (Calder et al., 2009). Gamification taps into this by incorporating social features such as leaderboards, multiplayer modes, and social challenges, which encourage users to connect and compete with others. Social engagement enhances the brand experience by fostering a sense of community and belonging, as users feel part of a larger network of individuals who share similar interests (Calder et al., 2009; Vivek et al., 2014). This interaction strengthens the overall brand identity and creates a deeper connection as users collaborate or compete, ultimately boosting brand loyalty (Xi & Hamari, 2020).

Currently, there is a lack of clear empirical evidence to form hypotheses regarding the relationship between gamification and brand engagement (Xi and Hamari, 2019; Xi and Hamari, 2020). However, by drawing insights from existing research on games, gamification, and brand engagement, parallels can be identified.

Concluding, through gamification companies are able to create a sense of loyalty on their consumers, due to the fact that, they believe and feel that the company is giving something back to them (Hwang & Choi, 2020). By creating this sense of loyalty, customers feel engage with the company and prefer to continue use the product or service of that specific company than the competition, creating a competitive advantage (Leclercq et al. 2017).

2.6 Brand engagement and Brand Awareness

According to Gustafson and Chabot (2007), the primary objective for most businesses is to boost sales and revenue. Ideally, businesses aim to attract new customers to their products while also fostering repeat purchases (Gustafson and Chabot, 2007). Brand awareness pertains to the level of familiarity customers and potential customers have with a business and its products

(Gustafson and Chabot, 2007). According to Abou-Shouk and Soliman (2021) awareness plays a crucial role in building brand knowledge and initiating visitors' commitment to a particular brand. It serves as a foundational stage in the development of brand loyalty (Abou-Shouk and Soliman, 2021). Businesses commonly regard customer engagement as fundamental to increasing customer awareness (Rather and Camilleri, 2019). Vivek et al., (2012) stated that this perspective is supported by marketing practitioners who see customer engagement as essential for fostering robust and lasting relationships with customers. As a result, businesses actively invest in utilizing innovative tools, such as gamification platforms, to enhance customer engagement and ultimately elevate brand awareness (Harwood & Garry, 2015; Leclercq, et al., 2018; Abou-Shouk and Soliman, 2021).

Moreover, according to Abou-Shouk and Soliman (2021), the storytelling content embedded within digital videos has emerged as a particularly effective strategy for captivating customers and forging deeper connections with brands. This multifaceted approach underscores the significance of engaging customers through various means to solidify brand awareness and cultivate brand loyalty (Abou-Shouk and Soliman, 2021).

According to Samala and Singh (2019), customer engagement plays a crucial role in capturing better customer attention towards brands, thus enhancing brand awareness. Similarly, Ting et al. (2020) discovered that customer engagement contributes to increased brand awareness by encouraging word-of-mouth sharing of brand information. Likewise, Xi and Hamari (2019) determined that destination marketing organizations (DMOs) predominantly utilize gamification as a strategy to boost brand awareness. Thus, by using gamification companies can increase customer loyalty, create intensification of the word of mouth and finally accomplish brand awareness (Henderson et al., 2011).

2.7 Duolingo

This thesis will concentrate its research on Duolingo to explore the impact of gamification on brand awareness among international users. Duolingo is a free language-learning platform available both on the web at [duolingo.com](https://www.duolingo.com) and as a mobile application (Munday, 2017). Duolingo offers 45 courses in different languages that possibilities the interaction and engagement with other cultures and people. According to its website, it boasts the largest user base globally, with over 150 million users (Duolingo, 2024). Duolingo utilizes gamification in the way that it becomes easy to develop the habit of learning languages with game-like features, enjoyable challenges, and reminders from its friendly mascot, Duo the owl (Duolingo, 2024).

“That's why we combine gamification with learning science to keep you motivated while studying a new language” (Duolingo blog, 2023).

2.7.1 How to start

To begin, users can download the Duolingo app on their smartphone or access the website at duolingo.com. They then select a language they wish to learn. Additionally, the app prompts users to set a goal, indicating whether they prefer a more casual or intensive learning approach.

Users are also asked about their familiarity with the chosen language, determining whether they are beginners or have prior knowledge. Based on the user's proficiency level, Duolingo either starts with foundational lessons or administers a placement test to gauge proficiency accurately.

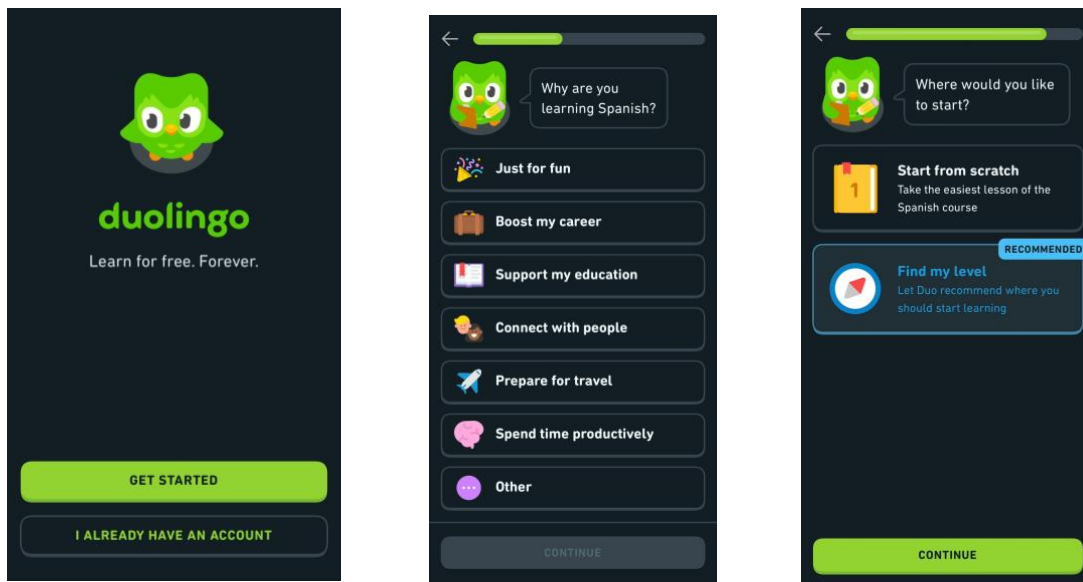


Figure 2.1 Screenshots of Duolingo App – How to start

2.7.2 Duolingo Features

The home screen of Duolingo is structured like a pathway that guides you through your language learning journey. This pathway is divided into units, each focusing on specific learning goals. Within these units, you'll encounter levels, represented as stepping stones along the path. Each level consists of multiple lessons, allowing you to progress through the material

in a structured and systematic manner. The lessons on Duolingo consists in a vary of challenges and exercises, such as speaking or writing.

Moreover, Duolingo is consistently improving their product and innovating, thus the app has several of different features with the aim of motivate and engage users, such as:

Guidebook: Within each unit guidebook, students will discover valuable tips covering vocabulary, grammar, and pronunciation, along with essential phrases. These concise explanations are designed to assist the user in concentrating on the crucial aspects of your lessons.

Stories: Engage in brief and enjoyable dialogues to practice reading and listening to conversational language. Through these interactions, students will effortlessly absorb words and phrases, all while enjoying the experience without the sensation of traditional studying.

Alphabet or character lessons: For languages that utilize non-Roman scripts, the app offers specialized lessons that concentrate on understanding the letters or characters, their pronunciation, and their meanings.

Practice: Practice sessions are seamlessly integrated into your learning path to ensure consistent reinforcement of concepts and skills as you progress in your language learning journey. If you're not subscribed to Super Duolingo, you can revisit any completed lesson by tapping on a gilded node along your path. For Super subscribers, the Practice Hub tab offers access to a variety of practice sessions, allowing you to further enhance your skills and knowledge.

Podcast: The Duolingo Podcast, which has received acclaim, presents captivating stories from various parts of the world in the language you're learning! These episodes are designed to aid comprehension with concise explanations from the narrator, and you have the option to follow along with the transcripts online.

2.7.3 Gamification in Duolingo

Duolingo uses gamification as a strategy to motivate and engage users in the continue learning process. According with the Duolingo blog (2023) the app uses gamification in the following way:

Experience Points (XP): Earn XP by completing lessons, reading Stories, or practicing. These points reflect users progress and accomplishments.

Leaderboards: Compare users total XP with friends' and compete globally in weekly Leaderboards competitions. The top XP earners in each league advance to the next level.

Streak: Streak shows the number of consecutive days a user completed a lesson.

Hearts: Similar to "lives" in video games, hearts are needed to finish a lesson. Mistakes cost hearts, which replenish over time or can be refilled with gems or practice sessions.

Gems: It is possible to earn gems (or Lingots on the web) by completing lessons. Use gems to purchase items from the Shop, such as a Streak Freeze, Timer Boost, or additional Hearts.

Furthermore, users have the option to subscribe to Super Duolingo, a premium service offering several benefits, including an ad-free experience, unlimited hearts, personalized practice sessions, and a monthly streak repair feature (this allows users to maintain their streak even if they miss a daily lesson).

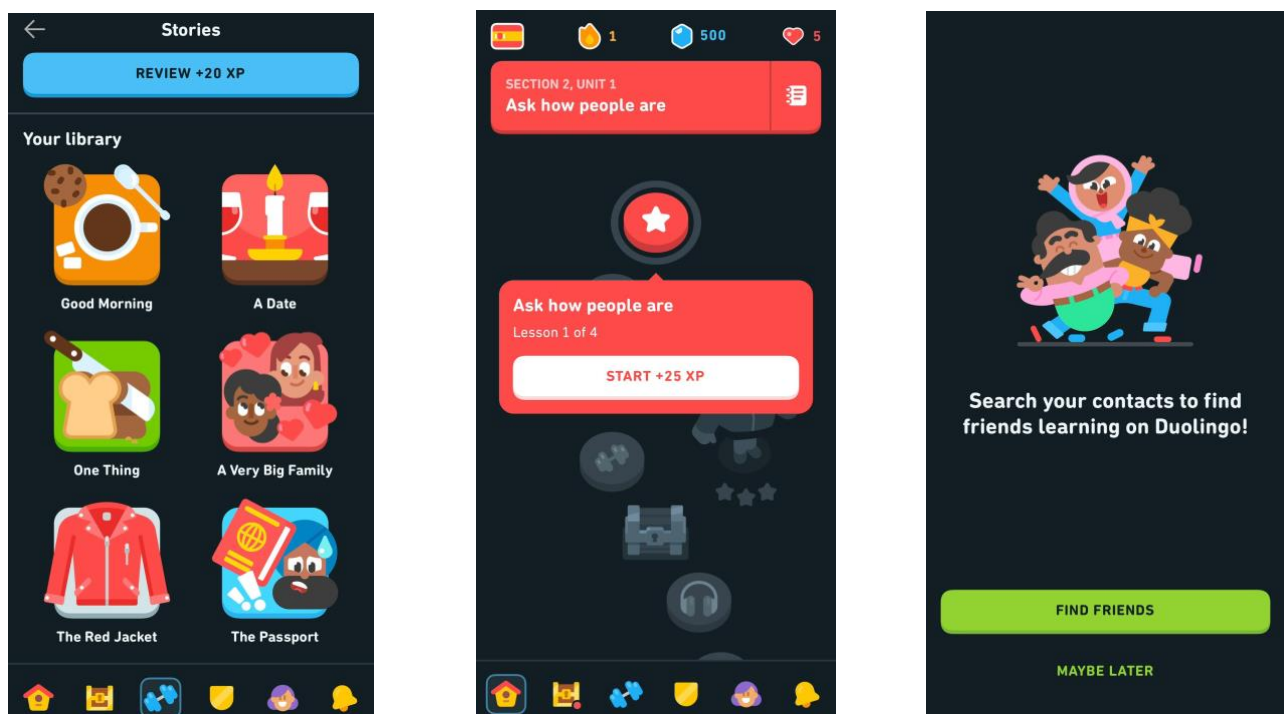


Figure 2.2 Screenshots of gamification features on Duolingo

CHAPTER 3

3.1 Conceptual model and hypothesis

The conceptual model and hypothesis chapter will present and develop the model used to analyze how does gamification has impact on brand awareness based on the literature review presented above and understand its limitations.

Xi and Hamari (2020) stated that in studies concerning game design, gamification, and player characteristics, researchers typically categorize game mechanics and motivations into three main areas: immersion, achievement, and social interaction. Moreover, according with Ryan and Deci (2000) these dimensions align with intrinsic needs identified in self-determination theory, such as autonomy, competence, and relatedness. Various studies, including those by Wolf et al. (2019) and Xi & Hamari (2019), have explored the connections between these dimensions. Therefore, the classification of gamification design into achievement, immersion, and social interaction draws support from multiple sources across different fields of literature (Xi and Himari, 2020). Immersive features in gamification, such as storytelling and role-play mechanics, are associated with emotional and affective aspects of engagement (Xi and Hamari, 2019). Interactions with these features are likely to evoke positive feelings and enthusiasm towards the brand. On the other hand, achievement-oriented features, like goal-setting and optimizing behavior, are linked to cognitive engagement (Xi and Hamari, 2019). Engaging with these features may result in goal-driven behavior and cognitive processing related to the brand (Xi and Hamari, 2019). Game features that incorporate social elements are likely to foster social engagement. In online brand-related contexts, the presence of social-oriented features enables customers to readily exchange information about the brand with others. This can lead to customers becoming brand advocates, thereby strengthening their connections with others based on their shared interest in the brand (Xi and Hamari, 2019).

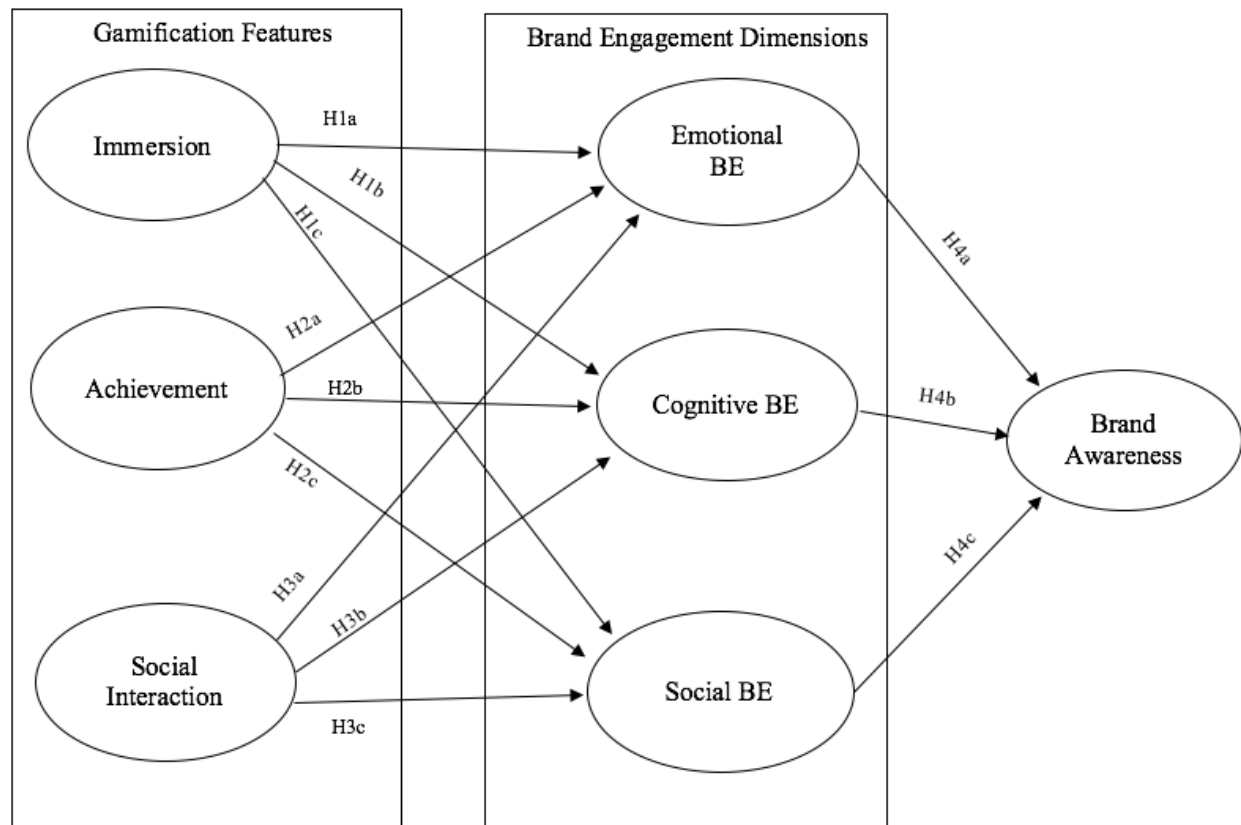


Figure 3.1 Conceptual Model

Source: Author's Elaboration

Adapted from: Permana et al. (2021); Xi and Hamari (2019)

Immersion:

Xi and Hamari (2020) describe immersion features related to immersion aim to fully engage players in self-directed exploration and inquiry. These features include game elements such as avatars, storytelling, narrative structures, and roleplay mechanics (Permana, et al. 2021). In similarity Mattke and Maier (2020) described immersion features as designed to engage users in self-directed and explorative activities, aiming to enhance their identification with the mobile app. These features satisfy the motivational need for autonomy, allowing users to feel a sense of freedom in completing tasks (Mattke and Maier, 2020).

H1a: Immersion features have a positive impact on emotional behavior dimensions of brand engagement.

H1b: Immersion features have a positive impact on cognitive behavior dimensions of brand engagement.

H1c: Immersion features have a positive impact on social behavior dimensions of brand engagement.

Achievement:

Related features are designed to boost players' sense of accomplishment. These include mechanics like badges, challenges, missions, goals, leaderboards, and progression metrics (Xi and Hamari, 2020; Permana, et al. 2021). Additionally, these features are implemented to provide users with a sense of accomplishment as they advance within the mobile app (Mattke and Maier, 2020). By allowing users to experience progress and overcome challenges, these features fulfill their motivational need for competence, fostering a feeling of mastery and skill development (Mattke and Maier, 2020; Permana et al., 2021).

H2a: Achievement features have a positive impact on emotional behavior dimensions of brand engagement.

H2b: Achievement features have a positive impact on cognitive behavior dimensions of brand engagement.

H2c: Achievement features have a positive impact on social behavior dimensions of brand engagement.

Social Interaction:

Social interaction-related features facilitate user interaction, fostering social engagement within the game (Jang et al., 2018; Permana et al., 2021). These features include mechanics such as team-based play, group activities, and competitive elements (Hamari and Tuunanen, 2014; Peng et al., 2012; Xi and Hamari, 2020). Moreover, according to Mattke and Maier (2020) social-related features are incorporated to create a sense of community among users, allowing them to interact with like-minded individuals. By facilitating social connections and fostering a sense of belonging and acceptance within a group, these features fulfill users' motivational need for social relatedness (Mattke and Maier, 2020; Permana et al., 2021).

H3a: Social Interaction features have a positive impact on emotional behavior dimensions of brand engagement.

H3b: Social Interaction features have a positive impact on cognitive behavior dimensions of brand engagement.

H3c: Social Interaction features have a positive impact on social behavior dimensions of brand engagement.

Emotional:

The emotional dimension of brand engagement refers to the deep sense of affection, enthusiasm, and excitement that consumers feel when interacting with a brand (Hollebeek et al., 2014). This emotional attachment reflects the extent to which individuals develop a positive and meaningful connection with the brand, often leading to heightened loyalty and engagement (Xi & Himari, 2020; So et al., 2014). These feelings are not just superficial but represent a profound emotional investment in the brand experience.

This emotional engagement can be closely linked to the immersion features of gamification discussed earlier. Immersive elements in gamified experiences, such as rich storytelling, visually engaging interfaces, or captivating challenges, can evoke strong emotional responses. By fully drawing users into the experience, gamification has the power to create moments of excitement, joy, and even affection towards the brand (Xi & Himari, 2020). As users become more immersed in these experiences, they are likely to develop a stronger emotional bond with the brand, reinforcing the emotional dimension of brand engagement.

Cognitive:

According to Vivek et al. (2014), cognitive brand engagement refers to the depth of interest and attention that individuals invest when interacting with a brand. So et al. (2014) further elaborate, explaining that this form of engagement involves conscious focus, sustained attention, and the extent to which individuals actively think about and process information related to the brand. Achievement-based features in gamification naturally align with this cognitive dimension, as they encourage goal-oriented behavior and strategic thinking. These features resonate with users' cognitive engagement by prompting them to invest mental effort, thereby linking gamification achievements to the cognitive aspects of brand engagement (Xi & Hamari, 2020).

Social:

Social brand engagement refers to the process of creating meaningful interactions that involve not just the individual, but also others within the brand's community, enhancing the overall engagement experience (Xi & Hamari, 2020; Xi & Hamari, 2019). This is particularly significant in digital environments, where individuals can socialize, share experiences, and actively participate in the brand's online ecosystem (Calder et al., 2009; Vivek et al., 2014). In this context, social behavior in brand engagement is closely tied to the social interaction features of gamification. By fostering a sense of community and encouraging collaboration or

competition among users, these social features amplify the connection between the user and the brand, leading to deeper engagement and a more dynamic brand experience.

H4a: Emotional behavior dimensions have a positive impact on brand awareness.

H4b: Cognitive behavior dimensions have a positive impact on brand awareness.

H4c: Social behavior dimensions have a positive impact on brand awareness.

CHAPTER 4

4.1 Methodology

The methodology section approaches how the author conducted the research and the methods used to collect and analyze the data (Murray and Hughes, 2008). In order to understand if gamification has an impact on the brand awareness among international end users this thesis is going to use Duolingo as a case study.

4.2 Research Approach

To achieve the objectives of this thesis, which is to understand if gamification has an impact on brand awareness among end users, a comprehensive research methodology will be employed, integrating both primary and secondary research.

The primary research will focus on the collection of quantitative data through the use of structured questionnaires aimed at capturing the perspectives and experiences of end users regarding gamification. These questionnaires will be carefully designed to align with the thesis's objectives, ensuring that the questions address key aspects of brand engagement and awareness as influenced by gamification features. Since this study uses Duolingo as a case study, the questions are specifically directed toward the experiences of Duolingo's international end users when engaging with the app.

In addition to primary data, secondary research will involve an extensive review of existing literature, including peer-reviewed scientific articles, academic journals, dissertations, and relevant books, as presented in chapter 2. This body of work will provide a theoretical foundation on the concept of gamification, its application in different industries, and its relationship to brand engagement and awareness, as outlined in the literature review.

Once both sets of data are collected, the results will be compared and critically analyzed. The primary and secondary research will be compared to identify any correlations, patterns, or divergences in the findings. This comparative analysis will help determine whether gamification has a measurable impact on brand awareness among international users and offer insights into the broader implications of these results for brands employing gamification strategies in their marketing efforts. The mixed-methods approach aims to provide a holistic understanding of gamification's effectiveness and its potential to enhance brand recognition in a global, digital marketplace.

4.3 Data Collection

To investigate the impact of gamification on brand awareness, data collection will be conducted through questionnaires distributed to end users. By focusing on end users as the sample, the study aims to assess whether implementing gamification strategies effectively fosters brand awareness among this group.

The questionnaire design is informed by existing literature and is aligned with the literature review presented in Chapter 2. Duolingo was selected as a case study because it has consistently employed gamification as a key strategy to engage and retain users.

Given that Duolingo originated in the United States, this study will primarily target the Portuguese population, with the possibility of including respondents of other nationalities.

There are no specific age restrictions for participants, ensuring a diverse and representative range of responses. To refine the questionnaire, a pilot test was conducted with a group of twenty individuals, allowing for feedback and subsequent adjustments to enhance its suitability and relevance (Creswell, 2007).

The survey was distributed via multiple social media platforms, including Instagram, Facebook, WhatsApp, and LinkedIn, using non-probabilistic sampling methods. This approach led to a snowball effect, where participants were encouraged to share the survey within their own networks, thereby broadening the reach and diversity of the sample.

4.4 Questionnaires' design

In relation with the primary research, as explained above, the thesis is going to proceed with questionnaires to understand how gamification has an impact in brand awareness to end users.

The survey is going to be divided in four parts and it was conceptualized in English with the aim to reach the most numbers of individuals. Additionally, a brief introduction regarding the research objectives was made, reinforcing the respondents' privacy and anonymity policy.

The second section of the questionnaire focuses on sociodemographic information and distinguishes between participants who have used Duolingo and those who have not. This distinction is crucial for understanding the brand awareness of users and identifying the factors that engage them with Duolingo.

The third section addresses gamification features, based on insights from the literature review and the research model. Drawing on models adapted from Permana et al. (2021) and Xi and Hamari (2019), this part examines whether participants agree or disagree with statements

related to various gamification elements for Duolingo users. The key gamification features explored are Immersion Features (I), Achievement Features (A), and Social Features (S).

The fourth section investigates brand engagement dimensions, focusing on how users interact with and engage with Duolingo as a brand. This section aims to measure whether participants agree or disagree with statements related to different aspects of engagement, specifically Emotional Behavior (EBE), Cognitive Behavior (CBE), and Social Behavior (SBE).

Lastly, the questionnaire examines the impact of both gamification features and brand engagement dimensions on brand awareness, in line with the research model. The final section specifically targets brand awareness, seeking to measure how well users recognize and identify with the brand.

The survey employed a 5-point Likert scale to measure responses, with 1 indicating strong disagreement, 2 indicating disagreement, 3 representing neutrality, 4 indicating agreement, and 5 representing strong agreement (Permana et al., 2021).

Table 4.1 - Sources of measurement for variables used on the survey

Variables	References
Immersion Gamification Features	Xi and Hamari (2019); Permana et al. (2021)
Achievement Gamification Features	Xi and Hamari (2019) Permana et al. (2021).
Social Gamification Features	Xi and Hamari (2019) Permana et al. (2021).
Emotion Behavior Dimension	Xi and Hamari (2019); Szyszka (2019).
Cognitive Behavior Dimension	Xi and Hamari (2019); Szyszka (2019).
Social Behavior Dimension	Xi and Hamari (2019); Szyszka (2019).
Brand Awareness	Xi and Hamari (2019) Permana et al. (2021).

4.5 Data Analysis

The Structural Equation Modeling (SEM) technique, specifically using Partial Least Squares (PLS), was applied to examine the relationships and causal effects within the proposed model (Hair et al., 2013). PLS-SEM is widely recognized in IT research and has significantly influenced international management and marketing studies (Henseler et al., 2009). This approach is particularly suitable for analyzing measurement models and confirming the causality within structural models. When the measurement model contains formative constructs, PLS-SEM is generally regarded as a more suitable technique for structural equation

modeling (Xi and Hamari, 2019). It is especially useful when dealing with characteristics like small sample sizes (Chin & Newsted, 1999), non-normal data distributions, and the ability to compute reflective or formative measurement models across various cause-effect scenarios (Diamantopoulos & Winklhofer, 2001). Therefore, the SEM using PLS was carried out with the Smart PLS 4.0 software.

CHAPTER 5

Results and Findings

5.1 Sample Characteristics

The sample for this study initially consisted of a total of 190 responses collected through a questionnaire distributed for research purposes. However, a rigorous filtering process was necessary to ensure the relevance and quality of the data analyzed. Among these 190 responses, 77 participants indicated that they do not use Duolingo, and were therefore excluded from the analysis, given that the focus of this study is solely on users or former users of the application. Furthermore, a number of participants, after starting to fill out the questionnaire, did not complete it. The incomplete responses were also discarded, as they do not meet the integrity requirements necessary for a rigorous and robust statistical analysis.

After applying these inclusion criteria, only 71 valid responses were considered, corresponding to individuals who confirmed using or having used Duolingo and who completed the questionnaire in its entirety. This group of 71 respondents constitutes the final sample used for the analysis. Within this sample, it is observed that 42 are women, representing 59.2% of the total respondents considered. In terms of education, 59 participants (83.1%) have higher education, demonstrating a high prevalence of individuals with a high educational level among the application users. Regarding nationality, 67 respondents (94.4%) are Portuguese, revealing a relatively homogeneous national context. In terms of age distribution, most participants are in the 24 to 29 age group (41 people, or 57.7%), followed by a smaller representation in the 30 to 41 age group (7 people, or 9.9%). These data reveal a sample profile predominantly composed of young adults with high academic qualifications and Portuguese nationality, providing a solid basis for analyzing the behaviors and perceptions of Duolingo users.

Table 5.1 Sample Characteristics

Characteristics	Frequency	Percentage
Gender		
Male	28	39,43%
Female	42	59,2%
Other	1	1,4%
Age Groups		
18-23	10	14,08%
24-29	41	47,75%
30-35	5	7,04%
36-41	2	2,82%
Other	13	18,31%
Education		
High School	10	14,08%
Bachelor Degree	30	43,66%
Master Degree	28	39,43%
Other	2	2,81%
Nationality		
Portuguese	67	94,4%
Other	4	5,63

5.2 Model Analysis

Based on the values presented in the table of results for the reliability and validity analyses of the reflective measurement model, we can discuss the adequacy of the constructs used in this study. The assessment of validity and reliability in a reflective model requires careful examination of metrics such as Cronbach's Alpha, Composite Reliability (ρ_a and ρ_c), and Average Variance Extracted (AVE) (Xi and Hamari, 2019).

As demonstrated in table 5.2 the reliability of a reflective construct measures the internal consistency of its indicators. In this study, Cronbach's Alpha and Composite Reliability were used to evaluate the internal consistency of each construct. The results indicate that most constructs have Cronbach's Alpha values above the minimum recommended of 0.7, suggesting good internal consistency (Hair et al., 2013).

However, the I (Immersion levels) construct has a Cronbach's Alpha of 0.631, which is below the recommended therefore the construct was removed. Composite Reliability (rho_a and rho_c) was also assessed for each construct. All constructs have rho_c values above 0.8, confirming good composite reliability.

Convergent validity refers to the degree to which indicators of a construct truly measure the same underlying concept. This validity is typically assessed by the Average Variance Extracted (AVE). An AVE value above 0.5 indicates that, on average, more than 50% of the variance in the indicators is explained by the construct, which is considered a good indicator of convergent validity. The results show that all constructs have AVE values above 0.5, ranging from 0.655 (CBE) to 0.837 (S), confirming the convergent validity of the measurement model. Overall, the evaluation of reliability and convergent validity metrics indicates that the proposed reflective measurement model is largely valid and reliable. Most constructs meet the established criteria for Cronbach's Alpha, Composite Reliability, and Average Variance Extracted, demonstrating adequate internal consistency and strong convergent validity.

Table 5.2 Validity and Reliability measurement (n=100)

	Cronbach's alpha (α)	Composite Reliability	AVE
Immersion	0.631	0.800	0.573
Achievement	0.802	0.880	0.712
Social Interactions	0.809	0.911	0.837
Emotional BE	0.852	0.910	0.772
Cognitive BE	0.730	0.849	0.655
Social BE	0.767	0.866	0.683
Brand Awareness	0.768	0.862	0.675

As the last stage to examine the validity of the measurement models, corresponds to the analysis of discriminant validity. The discriminant validity was evaluated following Fornel and Larcker's (1971) method, which according with M R Ab Hamid et al (2017) involves comparing the square root of each construct's AVE (found in the diagonal) with the correlation values between constructs (located outside the diagonal) in the same rows and columns. As it is demonstrated in table 5.3, the model is valid and fulfill with the respective criteria.

Table 5.3 Fornel and Larcker's method

	A	I	S	BA	CBE	EBE	SBE
A	0.844						
I	0.292	0.757					
S	0.286	0.444	0.915				
BA	0.378	0.390	0.212	0.822			
CBE	0.372	0.427	0.416	0.112	0.810		
EBE	0.296	0.407	0.398	0.151	0.748	0.879	
SBE	0.324	0.477	0.483	0.375	0.628	0.564	0.827

The cross loadings table plays a crucial role in evaluating the discriminant validity of constructs in factor analysis models, particularly in structural equation modeling methods like PLS (Partial Least Squares). Table 5.4 presents the loadings of each indicator (observed variable) on the various constructs (latent variables) within the model. For discriminant validity to be established, an indicator should exhibit a higher loading on its associated construct compared to any other construct. This confirms that the indicator is strongly linked to its intended construct. As illustrated, the questions in the questionnaire align closely with the constructs they are designed to measure, reinforcing their correct association and the validity of the model.

Table 5.4 Cross-Loadings

	A	I	S	BA	CBE	EBE	SBE
A1	0.739	0.246	0.188	0.197	0.242	0.196	0.151
A2	0.904	0.320	0.239	0.345	0.381	0.295	0.396
A3	0.878	0.150	0.300	0.393	0.287	0.238	0.204
I1	0.273	0.750	0.336	0.294	0.129	0.197	0.362
I2	0.236	0.831	0.381	0.239	0.389	0.397	0.370
I3	0.171	0.684	0.287	0.362	0.385	0.286	0.353
S1	0.289	0.293	0.891	0.139	0.312	0.330	0.371
S2	0.243	0.494	0.938	0.237	0.435	0.391	0.499
BA1	0.176	0.228	0.151	0.819	0.078	0.175	0.323
BA2	0.240	0.216	0.158	0.787	-0.064	-0.107	0.153
BA3	0.485	0.473	0.209	0.858	0.193	0.204	0.385
CBE1	0.285	0.367	0.339	0.031	0.690	0.599	0.358
CBE2	0.313	0.373	0.415	0.121	0.882	0.646	0.607
CBE3	0.301	0.280	0.225	0.119	0.844	0.553	0.547
EBE1	0.237	0.363	0.409	0.041	0.593	0.898	0.456
EBE2	0.309	0.327	0.354	0.202	0.767	0.852	0.593
EBE3	0.230	0.385	0.281	0.151	0.604	0.886	0.428
SBE1	0.243	0.346	0.421	0.285	0.481	0.434	0.829
SBE2	0.433	0.417	0.353	0.293	0.654	0.602	0.781
SBE3	0.123	0.416	0.424	0.350	0.417	0.357	0.868

5.3 Structure model analysis

To evaluate the structure model analysis, was performed a test to validate the multicollinearity, which can pose a problem for the model's design, as discussed by Farrar and Glauber (1967). The VIF, or Variance Inflation Factor, is a measure used in data analysis to identify multicollinearity among independent variables in a regression model. A high VIF indicates that a variable may be redundant because it is strongly related to other independent variables. As it is possible to analyze in table 5.5 all the values are bellow 5, being the highest 2.650 (CBE), indicating that there is low multicollinearity among independent variables.

Table 5.5 VIF (Variance Inflation Factor)

	Brand Awareness	Cognitive behavior	Emotional behaviour	Social Behaviour
Achievement Features		1.131	1.131	1.131
Immersion Features		1.293	1.293	1.293
Social Features		1.288	1.288	1.288
Cognitive Behaviour	2.650			
Emotional Behaviour	2.350			
Social Behaviour	1.709			

In this study, the coefficient of determination, or R^2 , will be utilized to evaluate the predictive power of the model. R^2 quantifies the proportion of the variance in the dependent variable that is explained by the independent variables included in the model. Essentially, R^2 indicates how well the model accounts for the variability in the outcome. A higher R^2 value, closer to 1, suggests that the model explains a significant portion of the variance, while a lower R^2 value, closer to 0, indicates less explanatory power. As it is possible to verify, in table 5.6, the SBE (Social Behavior) shows that the R^2 is 0.339, representing a weak value. As demonstrated in table 5.6, although all the values are below 0.339, the model study is adequate to clarify the variations of the variables.

Table 5.6 R-square

	R-square	R-square adjusted
Brand Awareness	0.167	0.130
Cognitive Behavior	0.293	0.261
Emotional Behavior	0.245	0.211
Social Behavior	0.339	0.309

To understand the effect size of an independent (exogenous) variable on a dependent (endogenous) variable, f^2 was analyzed. According to Cohen (1988), f^2 values can be interpreted as follows: 0.02 indicates a small effect, 0.15 represents a medium effect, and 0.35 signifies a large effect. If the value is below 0.02, it suggests that the variable has no meaningful impact (Sarstedt et al., 2017). As it is demonstrated in table 5.7, the variable with the strongest effect are Social Behavior (on brand engagement), with a medium effect on Brand Awareness.

All the others variables have a small effect, although Social features (S) and Immersion features (I) have values of 0.112 and 0.103 respectively, with an effect on Social Behavior, which are very close of 0.15. The variable of EBE (Emotional Behavior) has a value below 0.02, which we conclude that have no meaningful impact.

Table 5.7 *f*²

	Brand Awareness	Cognitive Behavior	Emotional Behavior	Social Behavior
Achievement Features		0.066	0.027	0.029
Immersion Features		0.071	0.067	0.103
Social Features		0.062	0.059	0.112
Cognitive Behaviour	0.025			
Emotional Behaviour	0.001			
Social Behaviour	0.174			

Finally, this study analyzes the path coefficient (ranging from -1 to +1), which is a key measure in structural equation modeling. The path coefficient quantifies the strength and direction of the relationships between variables in the model. To assess the quality of the path coefficient estimates, a bootstrap procedure was conducted. 1000 samples were generated using bootstrapping from the originally 73 examples. Additionally, the p-value obtained from this analysis is crucial for drawing conclusions about the study. The p-value indicates the probability that the observed results are due to chance. P-values less than a specified significance level (typically 0.05) suggest that the path coefficients are statistically significant, supporting the relevance of the identified relationships in the model.

The table 5.8 presents the path coefficients (β values), T-statistics, and P-values for the relationships between different constructs in the model. It is possible to analyze that the relationship between some variable are weak, for example: Achievement features and Emotional Behavior ($\beta = 0.152$, P-value=0.170); Achievement features and Social Behavior ($\beta = 0.148$, P-value=0.238); Cognitive Behavior and Brand Awareness ($\beta = -0.235$, P-value=0.231); Emotional Behavior and Brand Awareness ($\beta = 0.046$, P-value=0.827). Regarding Immersion features and Brand Engagement, Immersion features demonstrate positive and significant relationships with all dimensions of brand engagement. The path coefficients for cognitive dimensions ($\beta = 0.254$, P-value = 0.034), emotional dimensions ($\beta = 0.256$, P-value = 0.009), and social dimensions ($\beta = 0.297$, P-value = 0.004). Furthermore, Social features have positive

and significant impacts on all three dimensions of brand engagement. The path coefficients are 0.237 for Cognitive Behavior (P-value = 0.045), 0.240 for Emotional Behavior (P-value = 0.058), and 0.309 for Social Behavior (P-value = 0.001). The Emotional dimension is borderline insignificant (P-value = 0.058). Lastly, Social behavior shows a strong positive relationship with Brand Awareness ($\beta = 0.497$, P-value = 0.000), meaning that when consumers engage socially with the brand, it significantly boosts their awareness of the brand.

In conclusion, assuming the 5% significance level, it is possible to validate hypothesis H2a, H2c, H3a, H4a, and H4b as rejected and cannot be supported by this study. Although H3a is borderline, we cannot consider valid since has more than 0.05 as a P-value. On the other hand, the others can be considered valid and supported, as shown a significant impact on the study objectives.

Table 5.8 Model Results

Hypothesis	Path Coefficients	β	T Statistics	p values
H2b	A – CBE	0.230	2.304	0.021
H2a	A – ECB	0.152	1.373	0.170
H2c	A – SBE	0.148	1.180	0.238
H1b	I – CBE	0.254	2.122	0.034
H1a	I – ECB	0.256	2.602	0.009
H1c	I – SBE	0.297	2.874	0.004
H3b	S – CBE	0.237	2.005	0.045
H3a	S – ECB	0.240	1.900	0.058
H3a	S - SBE	0.309	3.358	0.001
H4b	CBE – BA	-0.235	1.199	0.231
H4b	EBE – BA	0.046	0.218	0.827
H4a	SBE – BA	0.497	3.761	0.000

Table 5.9 Hypothesis validation

Hypothesis	Conclusion
H1a: Immersion features have a positive impact on emotional behavior dimensions of brand engagement.	VALIDATED
H1b: Immersion features have a positive impact on cognitive behavior dimensions of brand engagement.	VALIDATED
H1c: Immersion features have a positive impact on social behavior dimensions of brand engagement.	VALIDATED
H2a: Achievement features have a positive impact on emotional behavior dimensions of brand engagement.	REJECTED
H2b: Achievement features have a positive impact on cognitive behavior dimensions of brand engagement.	VALIDATED
H2c: Achievement features have a positive impact on social behavior dimensions of brand engagement.	REJECTED
H3a: Social Interaction features have a positive impact on emotional behavior dimensions of brand engagement.	REJECTED
H3b: Social Interaction features have a positive impact on cognitive behavior dimensions of brand engagement.	VALIDATED
H3c: Social Interaction features have a positive impact on social behavior dimensions of brand engagement.	VALIDATED
H4a: Emotional behavior dimensions have a positive impact on brand awareness.	REDJECTED
H4b: Cognitive behavior dimensions have a positive impact on brand awareness.	REDJECTED
H4c: Social behavior dimensions have a positive impact on brand awareness.	VALIDATED

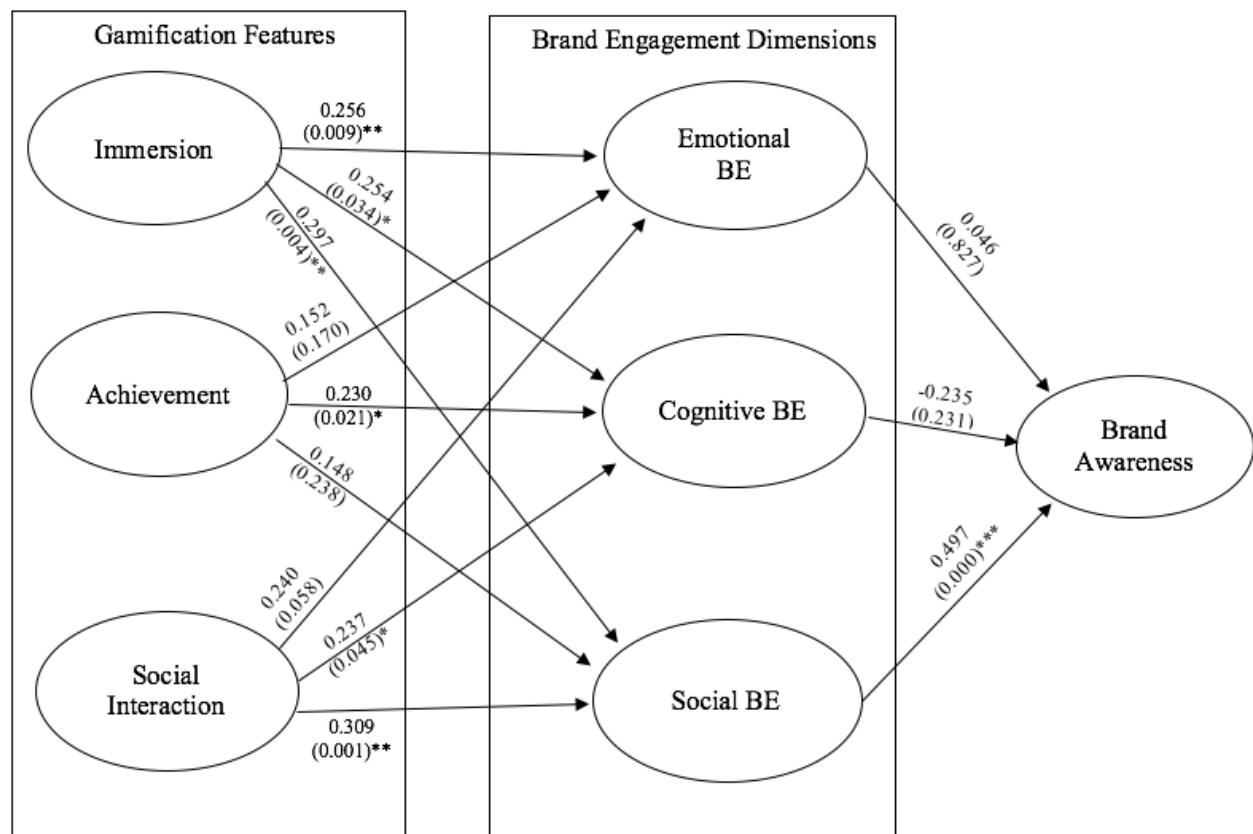


Figure 5.1 PLS Results Structure Model

Note: Bootstrapping times: 1000; *p < 0,05, **p < 0,01, ***p < 0,001

Source: Author's Elaboration

Adapted from: Permana et al. (2021); Xi and Hamari (2019)

5.4 Hypothesis discussion

The objective of this study is to explore the impact of gamification on brand awareness, using Duolingo as a case study. To achieve this, the analysis focuses on seven key dimensions: Immersion gamification features, Achievement gamification features, Social Interaction gamification features, Emotional behavior, Cognitive behavior, Social behavior, and Brand Awareness.

H1a: Immersion features have a positive impact on emotional behavior dimensions of brand engagement.

H1b: Immersion features have a positive impact on cognitive behavior dimensions of brand engagement.

H1c: Immersion features have a positive impact on social behavior dimensions of brand engagement.

As demonstrated in the analysis above, this study confirms that immersion-related features significantly influence all dimensions of brand engagement. This means that the more individuals become immersed in self-guided exploration and discovery, the deeper their engagement with a brand becomes across cognitive, emotional, and social aspects. These findings are consistent with earlier research conducted by Xi and Hamari (2019), which concluded that immersive features were positively associated with social brand engagement. However, in contrast to this study, Xi and Hamari (2019) research did not find a significant impact on emotional and cognitive dimensions of brand engagement.

In alignment with the observations made by Xi and Hamari (2020), our findings suggest that immersion-related features do indeed foster emotional brand engagement. The ability of these immersive elements to evoke emotions in users strengthens their connection with the brand. In the case of Duolingo, we can conclude that gamification features designed to promote immersion successfully create an emotional bond with users, increasing their overall brand engagement. Through such immersion, users are not only intellectually stimulated but also emotionally invested, enhancing their engagement with the platform across multiple dimensions.

H2a: Achievement features have a positive impact on emotional behavior dimensions of brand engagement.

H2b: Achievement features have a positive impact on cognitive behavior dimensions of brand engagement.

H2c: Achievement features have a positive impact on social behavior dimensions of brand engagement.

Regarding H2a, this study concludes that achievement-related features do not influence the emotional dimensions of brand engagement. While this contrasts with the findings of Xi and Hamari (2019), who observed a significant positive impact of achievement features on emotional engagement in their research, our results suggest otherwise. Similarly, previous research conducted by Permana et al., (2021) also found that achievement-driven elements had a measurable effect on emotional engagement. However, despite these earlier studies showing a notable connection between achievement features and emotional responses, this study indicates that such features may not evoke the same emotional impact in this particular context.

On the other hand, H2b was confirmed by this study, aligning with the expectations set by Xi and Hamari (2020), who highlighted that achievement-related features in gamification

generally resonate with a cognitive approach. These features tend to promote goal-oriented engagement, thereby connecting strongly with the cognitive aspects of brand engagement. Similarly, previous studies conducted by Permana et al., (2021), as well as Xi and Hamari (2019), further validate this finding, demonstrating that achievement features dimensions have a clear influence on the cognitive dimensions of brand engagement. In the context of Duolingo, we can conclude that its achievement-driven features foster a strong sense of accomplishment, which, in turn, enhances users' cognitive engagement with the brand. This sense of achievement encourages users to actively engage with the platform, focusing on their progress and goals, thereby strengthening their connection to the brand on an intellectual and goal-focused level.

Moreover, the hypothesis stating that "Achievement features positively impact the social behavior dimensions of brand engagement" (H2c) was not supported by the findings of this study. The results indicate that achievement-related features do not significantly influence the social aspects of brand engagement. In other words, the sense of personal achievement does not appear to drive users to engage with the brand on a social level. Contrary to these findings, previous studies, including those referenced earlier, have reported differing results. For instance, in the study conducted by Permana et al., (2021), the use of leaderboard features was highlighted as an example where achievement elements actively contributed to enhancing the social dimension of brand engagement. This suggests that while certain gamification features like leaderboards can foster competition and interaction among users, this effect was not observed in the current study's context.

H3a: Social Interaction features have a positive impact on emotional behavior dimensions of brand engagement.

H3b: Social Interaction features have a positive impact on cognitive behavior dimensions of brand engagement.

H3c: Social Interaction features have a positive impact on social behavior dimensions of brand engagement.

Additionally, this study finds that social features in gamification do not significantly influence the emotional dimensions of brand engagement. This suggests that the interactions users have with their friends or peers on platforms like Duolingo do not enhance their emotional connection or attachment to the brand itself. Similarly, study Permana et al., (2021) arrived at a comparable conclusion, noting that social features primarily facilitate user-to-user interactions rather than fostering a deeper emotional relationship with the brand. Since these

social exchanges occur between individuals, the emotional engagement with the brand remains unaffected, as users may not be consciously reflecting on their feelings toward the brand while engaging with others (Permana et al., 2021). However, this contrasts with the findings of Xi and Hamari (2019), who concluded that social interaction features indeed have a positive influence on the emotional aspects of brand engagement. Their study suggests that social features can evoke emotional responses that contribute to a stronger emotional bond between users and the brand, a result not mirrored in the current study.

With regard to hypotheses H3b and H3c, this study validates both, as demonstrated in the previous analysis.

The findings suggest that social interaction features have a positive impact on users' cognitive engagement with the brand. The cognitive aspect of friendly competition fosters not only a sense of achievement but also a sense of social interaction, which likely contributes to this result. This conclusion aligns with the studies conducted by Xi and Hamari (2019) and Permana et al. (2021), who similarly noted that social features enhance users' curiosity and desire to learn more about a brand.

These features, such as those used in virtual live sessions by sellers, help users to become more invested in and interested in a brand through cognitive engagement, stimulated by social interactions. Thus, the combination of cognitive stimulation and social interaction appears to deepen user engagement with the brand, fostering a meaningful connection.

This study also highlights that social interaction features positively influence the social dimensions of brand engagement, as anticipated. Social brand engagement involves enhancing interactions by bringing others into the engagement process, as noted by Xi and Hamari (2019, 2020). This is particularly important in online environments, where individuals engage with the brand's digital community and build connections (Calder et al., 2009; Vivek et al., 2014).

Both the Xi and Hamari (2019) and Permana et al. (2021) studies reached similar conclusions. These findings suggest that features such as friendly competition or social interactions on platforms like Duolingo significantly contribute to users' social engagement with the brand. This enhanced social connection may also encourage users to recommend the app to others, further amplifying its impact through personal networks and fostering a community-driven engagement process.

H4a: Emotional behavior dimensions have a positive impact on brand awareness.

H4b: Cognitive behavior dimensions have a positive impact on brand awareness.

H4c: Social behavior dimensions have a positive impact on brand awareness.

This study concludes that neither the emotional nor cognitive dimensions of brand engagement significantly influence brand awareness. This implies that users who engage deeply with a brand on an emotional or cognitive level may still not develop a heightened recognition or awareness of that brand. Despite feeling emotionally connected or cognitively engaged, this connection doesn't necessarily translate into an increased ability to recall or recognize the brand outside of their interactions with it.

A similar outcome was observed in the research by Permana et al. (2021), particularly concerning the cognitive dimension. Their study noted that users within this dimension tend to focus more on the interactions they have with the brand, rather than on the brand itself. This means users may engage with a brand's features or content but not develop stronger brand awareness unless the brand actively initiates interactions that make its identity more prominent. However, the findings of Xi and Hamari (2019) present a contrasting view. Their research validated that both emotional and cognitive engagement significantly enhance brand awareness. In their perspective, users who connect emotionally with a brand or engage with it on a cognitive level—whether through problem-solving or thoughtful interaction—are more likely to recognize and recall the brand. This suggests that emotional and intellectual involvement can, in fact, bolster how much the brand stands out to users in their memory and perceptions, directly influencing brand awareness.

Lastly, with respect to H4c, this study reveals that among the various dimensions of brand engagement, only the social dimension has a positive influence on brand awareness. Duolingo's integration of social gamification features plays a crucial role in enhancing users' social engagement with the app, which in turn heightens their awareness of the brand. Users who engage with others through the platform—whether by recommending Duolingo to friends—develop a stronger recognition of the brand. This includes the ability to identify the brand's logo and distinguish it from competitors, which is a significant advantage for brand visibility and recall. This outcome aligns with the findings of Xi and Hamari (2019), who also concluded that social behavior fosters brand awareness. The capacity to connect users in a social context not only deepens their engagement with the app but also strengthens their overall connection to the brand, making them more likely to recognize and advocate for it in their social circles.

CHAPTER 6

Conclusion

6.1 Final conclusions

Following the completion of this study, it is evident that Duolingo's Immersion gamification features—such as narrative elements, avatars, and personalization—have a strong positive influence on brand engagement. These features create a deeper connection between users and the brand, fostering excitement and curiosity that often leads to further exploration of the app and a desire to share it with friends and family. Users feel more involved and emotionally tied to the brand through these immersive experiences.

From the findings of this study, it becomes clear that among the various gamification features, the achievement elements primarily influence the cognitive behavior aspect of brand engagement. This means that features like advancing through levels or earning points give users a sense of accomplishment, driving them to learn more about Duolingo and stay informed about updates or news related to the brand. However, when it comes to emotional or social engagement, achievement features do not seem to have a significant impact. Moreover, while these features may stimulate cognitive engagement, this connection does not extend to enhancing users' brand awareness. In other words, despite being cognitively engaged, users may still not recognize Duolingo's logo or associate specific traits with the brand.

Additionally, the study concludes that social gamification features—such as friendly competition and social interactions—do not significantly affect emotional engagement. However, these features do contribute positively to both cognitive and social dimensions of brand engagement. For instance, by participating in friendly competitions or interacting with others within the app, users develop a curiosity about the brand and are more likely to recommend it to others. Yet, much like the immersive features, this increased engagement does not always translate into heightened brand awareness. Users may thoroughly enjoy their interactions on the platform, but this does not mean they are fully aware of Duolingo's branding or can easily recognize its logo or distinctive elements.

In summary, the study demonstrates that among the various dimensions of brand engagement, only the social behavior dimension has a meaningful impact on brand awareness. By incorporating social gamification features, Duolingo fosters both cognitive and social engagement, which in turn encourages users to learn more about the brand and share it with their social circles. This level of engagement significantly boosts brand awareness, leading to better recognition of Duolingo's logo and unique attributes, setting it apart from competitors.

6.2 Management implications

The findings of this study on the impact of gamification on brand awareness in international users have several important management implications that can be applied across different areas of business strategy and operations.

First, marketing management stands to benefit from the insights gained in this study. Gamification strategies, particularly those that leverage social interaction features, can be powerful tools for increasing brand awareness. Marketing managers should focus on creating campaigns that engage users on both cognitive and social levels. For example, integrating leaderboards, user-generated content, and community challenges into brand experiences can foster higher levels of engagement and drive word-of-mouth marketing. These strategies not only enhance user interaction but also increase the likelihood of brand recognition, helping businesses differentiate themselves in competitive markets.

In customer relationship management (CRM), this study suggests that gamification can be an effective way to enhance customer loyalty and retention. By designing gamified experiences that tap into users' social behavior, companies can encourage long-term engagement with their brand. CRM systems could integrate gamified rewards and recognition programs to maintain customer interest and encourage repeated interactions with the brand.

Human resources management can also draw valuable insights from this study. Gamification techniques could be applied internally to employee training and engagement programs. By fostering a sense of accomplishment and encouraging friendly competition among employees, HR managers can improve productivity and create a more motivated workforce. Furthermore, social gamification features can enhance team collaboration and communication, aligning employee behavior with the company's brand and culture.

Finally, in international business management, the study reveals that gamification can serve as a strategy for growing brand awareness in global markets. Brands seeking international expansion can leverage social gamification features to connect with a broader audience and create localized engagement strategies that resonate with diverse cultural contexts. By using gamification to drive user-generated content and community engagement, brands can quickly build awareness and loyalty in new markets, reducing the barriers to entry.

In conclusion, the application of gamification strategies, especially those that emphasize social interaction and cognitive engagement, can significantly enhance brand awareness across

different management areas, including marketing, CRM, human resources, and international business strategy.

6.3 Limitations and future research recommendations

In any research, it is essential to acknowledge the limitations and areas for improvement, as they provide context for interpreting the findings and offer guidance for future investigations.

This section outlines some of the primary constraints encountered in the present study, which aimed to explore the impact of gamification on brand awareness using Duolingo as a case study. While the study provides valuable insights, several limitations related to the availability of research, sample size, and scope of analysis must be considered. Additionally, recommendations for future studies are provided to address these gaps and enhance the understanding of gamification's role in brand awareness and engagement.

One of the primary limitations of this study is the limited availability of research on gamification. Although gamification has become an increasingly popular strategy across various industries, the number of studies exploring its impact—especially in relation to brand awareness and brand engagement—remains scarce. This scarcity posed a challenge during the literature review and made it difficult to compare the findings of this study with previous research.

Another limitation is the small sample size. With only 73 participants who completed the online questionnaire, the sample is relatively small, potentially affecting the generalizability and precision of the results. For future research, it would be beneficial to work with a larger sample size, as this would provide more robust and reliable findings.

A further recommendation for future studies would be to investigate those who do not use Duolingo or similar gamified apps. Understanding why these individuals choose not to engage with such apps, or if they are even aware of them, could offer valuable insights. This aspect was not explored in the current study and could be seen as a limitation. Conducting qualitative research in this area would help to uncover deeper reasons for low brand awareness among non-users and provide a more comprehensive understanding of the factors at play. This approach could offer meaningful insights into how companies can improve brand visibility and adoption.

References

- Asaj, N., Könings, B., Poguntke, M., Schaub, F., Wiedersheim, B., & Weber, M. (2012). RTMI '12 - Proceedings of the 4th Seminar on Research Trends in Media Informatics. Institute of Media Informatics Ulm University. <https://doi.org/10.18725/oparu-1773>
- Abou-Shouk, M., & Soliman, M. (2021). The impact of gamification adoption intention on brand awareness and loyalty in tourism: The mediating effect of customer engagement. *Journal of Destination Marketing & Management*, 20, 100559. <https://doi.org/10.1016/j.jdmm.2021.100559>
- Andrade, s. (2016). Os antecedentes da gamificação e suas influencias: um estudo por meio das equações estruturais [trabalho de conclusão de curso (tcc), faculdade de tecnologia e ciências sociais aplicadas -fatecs]. <https://repositorio.uniceub.br/jspui/bitstream/235/9376/1/21150452.pdf>
- Battur, A., & Kandagal, P. B. (2022). Exploring the concept of gamification and employee engagement in IT industry. *Sruti Management Review*, 15(2), 81-94. Retrieved from <https://www.proquest.com/scholarly-journals/exploring-concept-gamification-employee/docview/2767750407/se-2>
- Blanco, C. (2022, November 28). How to use Duolingo for language learning. Duolingo Blog. <https://blog.duolingo.com/duolingo-101-how-to-learn-a-language-on-duolingo/>
- Brodie, R. J., Hollebeek, L. D., Jurić, B., & Ilić, A. (2011). Customer engagement: Conceptual domain, fundamental propositions, and implications for research. *Journal of Service Research*, 14(3), 252–271.
- Burke, B. (2014). Gamify: How gamification motivates people to do extraordinary things. <https://openlibrary.org/books/OL27161941M/Gamify>
- Calder, B. J., Malthouse, E. C., & Schaedel, U. (2009). An Experimental Study of the Relationship between Online Engagement and Advertising Effectiveness. *Journal of Interactive Marketing*, 23(4), 321–331. <https://doi.org/10.1016/j.intmar.2009.07.002>
- Chapman, L. (2011). Start-ups and corporations alike having fun with gamification. *VentureWire*, Retrieved from <https://www.proquest.com/trade-journals/start-ups-corporations-alike-having-fun-with/docview/887644862/se-2>
- Chin, W. W., & Newsted, P. R. (1999). Structural equation modeling analysis with small samples using partial least squares. In R. H. Hoyle (Ed.), *Statistical strategies for small sample research*, 307-341. Thousand Oaks: CA: Sage Publications. https://www.researchgate.net/publication/242370645_Structural_Equation_Modeling_Analysis_with_Small_Samples_Using_Partial_Least_Square
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale. <https://www.utstat.toronto.edu/~brunner/oldclass/378f16/readings/CohenPower.pdf>
- Creswell, J. W. (2007). *Projeto de pesquisa: métodos qualitativo, quantitativo e misto* (2nd ed.). Maria Imilda da Costa e Silva. https://edisciplinas.usp.br/pluginfile.php/696271/mod_resource/content/1/Creswell.pdf
- Diamantopoulos, A., & Winklhofer, H. M. (2001, May). Index Construction with Formative Indicators: An Alternative to Scale Development. *Journal of Marketing Research*, 38(2). <https://doi.org/10.1509/jmkr.38.2.269.1884>
- Deterding, S., Dixon, D., Khaled, D., & Nacke, L. (2011). From game design elements to gamefulness: defining “gamification”. *Proceedings of the 15th International Academic MindTrek. Envisioning Future Media Environments*, 9-15.
- Deterding, S., Sicart, M., Nacke, L., O'Hara, K., & Dixon, D. (2011). Gamification. Using game-design elements in non-gaming contexts. *Proceedings of the 2011 Annual*

- Conference Extended Abstracts on Human Factors in Computing Systems - CHI EA '11. <https://doi.org/10.1145/1979742.1979575>
- Duolingo - Aprenda um idioma grátis @duolingo. (n.d.). Duolingo. <https://pt.duolingo.com/>
- Gustafson, T., & Chabot, B. (2007). Brand awareness. <https://www.nnyagdev.org/maplefactsheets/CMB%20105%20Brand%20Awareness.pdf>
- Farrar, D. E., & Glauber, R. R. (1967, February). Multicollinearity in Regression Analysis: The Problem Revisited. *The Review of Economics and Statistics*, 49(1), 92-107. <https://doi.org/10.2307/1937887>
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2013). Partial least squares structural equation modeling: Rigorous applications, better results and higher acceptance. *Long Range Planning: International Journal of Strategic Management*, 46(1-2), 1-12. <https://doi.org/10.1016/j.lrp.2013.01.001>
- Hamari, J. (2013). Transforming homo economicus into homo ludens: A field experiment on gamification in a utilitarian peer-to-peer trading service. *Electronic Commerce Research and Applications*, 12(4), 236-245. <https://doi.org/10.1016/j.elerap.2013.01.004>
- Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does Gamification Work? – A Literature Review of Empirical Studies on Gamification. *The 47th Hawaii International Conference on System Sciences*. <https://doi.org/10.1109/HICSS.2014.337>
- Hamari, J., & Tuunanen, J. (2014). Player types: a meta-synthesis. *ToDiGRA*, 1(2). <https://doi.org/10.26503/todigra.v1i2.13>
- Harwood, T., & Garry, T. (2015). An investigation into gamification as a customer engagement experience environment. *Journal of Services Marketing*, 29(6/7), 533-546. <https://doi.org/10.1108/JSM-01-2015-0045>
- Hamid, M. R. A., Sami, W., & Sidek, M. H. M. (2017). Discriminant Validity Assessment: Use of Fornell & Larcker criterion versus HTMT Criterion. *Journal of Physics Conference Series*, 890, 012163. <https://doi.org/10.1088/1742-6596/890/1/012163>
- Henderson, C. H., Beck, J. T., & Palmatier, R. W. (2011). Review of the theoretical underpinnings of loyalty programs. *Journal of Consumer Psychology*, 21(3), 256-276. <https://doi.org/10.1016/j.jcps.2011.02.007>
- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009, March). The use of partial least squares path modeling in international marketing. In R. R. Sinkovics & P. N. Ghauri (Eds.), *Advances in International Marketing*. Emerald, 237-319. [https://doi.org/10.1108/S1474-7979\(2009\)0000020014](https://doi.org/10.1108/S1474-7979(2009)0000020014)
- Hollebeek, L. D., Glynn, M. S., & Brodie, R. J. (2014). Consumer brand engagement in social Media: conceptualization, scale development and validation. *Journal of Interactive Marketing*, 28(2), 149-165. <https://doi.org/10.1016/j.intmar.2013.12.002>
- Huotari, K., & Hamari, J. (2012). Defining gamification: a service marketing perspective.”. *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments*, 17-22. <https://doi.org/10.1145/2393132.2393137>
- Hwang, J., & Choi, L. (2020). Having fun while receiving rewards?: Exploration of gamification in loyalty programs for consumer loyalty. *Journal of Business Research*, 106, 365-376. <https://doi.org/10.1016/j.jbusres.2019.01.031>
- Ismail, M. E., N, S., Samsudin, M. A., Hamzah, N., Razali, N., & Mahazir, I. I. (2018). Implementation of the gamification concept using KAHOOT! among TVET students: An observation. *Journal of Physics: Conference Series*, 1140(1) doi:<https://doi.org/10.1088/1742-6596/1140/1/012013>
- Jang, S., Kitchen, P. J., & Kim, J. (2018). The effects of gamified customer benefits and characteristics on behavioral engagement and purchase: Evidence from mobile exercise

- application uses. *Journal of Business Research*, 92, 250–259. <https://doi.org/10.1016/j.jbusres.2018.07.056>
- Kankanhalli, A., Taher, M., Cavusoglu, H., & Kim, S. H. (2012). Gamification: A new paradigm for online user engagement. *Gamification: A New Paradigm for Online User Engagement*, 3573–3582. <https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1192&context=icis2012>
- Kim, B. (2015). Understanding gamification. American Library Association.
- Koivisto, J., & Hamari, J. (2019). The rise of motivation information systems: A review of gamification research. *International Journal of Information Management*, 45, 191–210. <https://doi.org/10.1016/j.ijinfomgt.2018.10.013>
- Kusuma, G. P., Wigati, E. K., Utomo, Y., & Putera Suryapranata, L. K. (2018). Analysis of Gamification Models in education using MDA Framework. *Procedia Computer Science*, 135, 385–392. <https://doi.org/10.1016/j.procs.2018.08.187>
- Leclercq, T., Hammedi, W., & Poncin, I. (2018). The boundaries of gamification for engaging customers: Effects of losing a contest in online co-creation communities. *Journal of Interactive Marketing*, 44, 82–101.
- Leclercq, T., Poncin, I., & Hammedi, W. (2017). The Engagement Process During Value Co-Creation: Gamification in New Product-Development Platforms. *International Journal of Electronic Commerce*, 21, 454–488. <https://doi.org/10.1080/10864415.2016.1355638>
- Mattke, Jens and Maier, Christian, "Gamification: Feature-Rich Mobile Applications, Brand Awareness And Loyalty" (2020). *ECIS 2020 Research Papers*. 120. https://aisel.aisnet.org/ecis2020_rp/120
- Mirzaie Feiz Abadi B, Khalili Samani N, Akhlaghi A, Najibi S, Bolourian M. Pros and Cons of Tomorrow's Learning: A Review of Literature of Gamification in Education Context. *Med Edu Bull* 2022; 3(4): 543-54. DOI: 10.22034/meb.2022.350941.1063
- Munday, P. (2017). Duolingo. Gamified learning through translation. *Journal of Spanish Language Teaching*, 4(2), 194–198. <https://doi.org/10.1080/23247797.2017.1396071>
- Murray, N. and Hughes, G. (2008) *Writing up your University Assignments and Research Projects*. Open University Press.
- Nacke, L., Bateman, C., & Mandryk, R. (2013). BrainHex: A Neurobiological Gamer Typology Survey. *Entertainment Computing*, 5(1), 55–62. <https://doi.org/10.1016/j.entcom.2013.06.002>
- Nicholson, S. (2014). A RECIPE for Meaningful Gamification. In Reiners, T., Wood, L. (Eds.), *Gamification in Education and Business* (pp.1–20). Springer. https://doi.org/10.1007/978-3-319-10208-5_1
- Peng, W., Lin, J., Pfeiffer, K. A., & Winn, B. (2012). Need satisfaction Supportive game features as motivational determinants: an experimental study of a Self-Determination theory guided Exergame. *Media Psychology*, 15(2), 175–196. <https://doi.org/10.1080/15213269.2012.673850>
- Permana, F. H., Handayani, P. W., & Pinem, A. A. (2021). The Influence of Gamification on Brand Engagement and Brand Awareness in Online Marketplaces. <https://doi.org/10.1109/icacsis53237.2021.9631349>
- Rather, R., & Camilleri, M. (2019). The effects of service quality and consumer-brand value congruity on hospitality brand loyalty. *Anatolia*, 30(4), 547–559. <https://doi.org/10.1080/13032917.2019.1650289>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066x.55.1.68>

- Robson, K., Plangger, K., Kietzmann, J. H., McCarthy, I., & Pitt, L. (2015). Is it all a game? Understanding the principles of gamification. *Business Horizons*, 58(4), 411-420. <https://doi.org/10.1016/j.bushor.2015.03.006>
- Samala, N., & Singh, S. (2019). Millennial's engagement with fashion brands. *Journal of Fashion Marketing and Management*, 23(1), 2–16. <https://doi.org/10.1108/jfmm-04-2018-0045>
- Saunders, M., Lewis, P. and Thornhill, A. (2016) *Research Methods for Business Students*. Pearson Education Limited. 7th ed.
- So, K. K. F., King, C., & Sparks, B. (2012). Customer engagement with tourism brands. *Journal of Hospitality & Tourism Research*, 38(3), 304–329. <https://doi.org/10.1177/1096348012451456>
- Sarstedt, M., Ringle, C. M., & Hair, J. (2017, September). Partial Least Squares Structural Equation Modeling. In C., Homburg, M., Klarmann, & A., Vomberg (Eds.), *Handbook of Market Research*. Springer. https://doi.org/10.1007/978-3-319-05542-8_15-1
- Szyszk, N. D. (2019). Gamification in Marketing: Aspects influencing intention of engagement and brand attitude. <https://repositorio-aberto.up.pt/bitstream/10216/123349/2/362346.pdf>
- Ting, D. H., Abbasi, A. Z., & Ahmed, S. (2020). Examining the mediating role of social interactivity between customer engagement and brand loyalty. *Asia Pacific Journal of Marketing and Logistics*, 33(5), 1139–1158. <https://doi.org/10.1108/apjml-10-2019-0576>
- Vivek, S. D., Beatty, S. E., Dalela, V., & Morgan, R. M. (2014). A generalized multidimensional scale for measuring customer engagement. *Journal of Marketing Theory and Practice*, 22(4), 401–420. <https://doi.org/10.2753/mtp1069-6679220404>
- Vivek, S., Beatty, S., & Morgan, R. (2012). Customer engagement: Exploring customer relationships beyond purchase. *Journal of Marketing Theory and Practice*, 20(2), 122–146. <https://doi.org/10.2753/MTP1069-6679200201>
- Werbach, K., & Hunter, D. (2012). *For the win*. Wharton School Press.
- Wolf, T., Weiger, W., & Hammerschmidt, M. (2019). Experiences that matter? The motivational experiences and business outcomes of Gamified Services. *Journal of Business Research*. In press. <https://doi.org/10.1016/j.jbusres.2018.12.058>.
- Xi, N., & Hamari, J. (2019). The relationship between gamification, brand engagement and brand equity. *Proceedings of the . . . Annual Hawaii International Conference on System Sciences/Proceedings of the Annual Hawaii International Conference on System Sciences*. <https://doi.org/10.24251/hicss.2019.099>
- Xi, N., & Hamari, J. (2020). Does gamification affect brand engagement and equity? A study in online brand communities. *Journal of Business Research*, 109, 449–460. <https://doi.org/10.1016/j.jbusres.2019.11.058>
- Zichermann, G., & Cunningham, C. (2011). *Gamification by Design: Implementing Game Mechanics in Web and Mobile Apps*. (1st ed.). O'Reilly Media

APPENDIXES

Appendix A. Questionnaire

Construct	ID	Items	Scale	
Respondent Profile	AGE	Age	Years	
	GENDER	Gender	Female; Male; Other	
	EDUCATION	Education	High School; Bachelor Degree; Master Degree; Other	
	NATIONALITY	Nationality	Portuguese; Spanish; British; French; Other	
	USE OF THE APP	Use of Duolingo	Yes; No	
Construct	ID	Items	Scale	References
Immersion (I)	I1	For me, it is important that Duolingo has narratives or stories.	1-5 Likert Scale	(Permana, et al., 2021); Xi and Hamari (2019).
	I2	For me, it is important that I can create my avatar on my Duolingo account.		
	I3	For me, it is important that I can personalize my Duolingo account.		
Achievement (A)	A1	For me, it is important that I can pass levels on Duolingo.	1-5 Likert Scale	(Permana, et al., 2021); Xi and Hamari (2019).
	A2	For me, it is important that Duolingo has challenges.		
	A3	For me, it is important that I can earn XP (Points) on Duolingo.		
Social (S)	S1	For me, it is important that Duolingo allows me to have social interaction.	1-5 Likert Scale	(Permana, et al., 2021); Xi and Hamari (2019).
	S2	For me, it is important that Duolingo allows me to have friendly competition.		
Emotional Behavior (EBE)	EBE1	I feel excited about Duolingo	1-5 Likert Scale	Xi and Hamari (2019); Szyszka (2019).
	EBE2	I am enthusiastic about Duolingo		
	EBE3	I am heavily into Duolingo		
Cognitive Behavior (CBE)	CBE1	I would like to learn more about Duolingo	1-5 Likert Scale	Xi and Hamari (2019); Szyszka (2019).
	CBE2	I pay a lot of attention to anything about Duolingo		
	CBE3	Anything related to Duolingo grabs my attention		
Social Behavior (SBE)	SBE1	I love talking and using features of Duolingo with my friends	1-5 Likert Scale	Xi and Hamari (2019); Szyszka (2019).
	SBE2	Talking and using products of Duolingo are more fun when other people around me do it too		
	SBE3	I like recommending Duolingo to others		
Brand Awareness (BA)	BA1	I can quickly recall the symbol or logo of Duolingo	1-5 Likert Scale	Xi and Hamari (2019); (Permana, et al., 2021).
	BA2	Some characteristics of Duolingo come to my mind quickly if I think about the brand.		
	BA3	I can recognize Duolingo among other competing brands		

Appendix B. Path Model (Smart PLS 4 Results)

