VISUAL SEMIOTIC ANALYSIS OF GAMIFICATION ELEMENTS IN DUOLINGO GERMAN

Azah Afifah[1], Odi Nurdiawan[2], Arif Rinaldi Dikananda[3]

[1,2,3] Informatics Engineering Study Program, STMIK IKMI Cirebon, Indonesia
Email: [1*]azahafi1355@gmail.com

Abstrak

Kemajuan teknologi digital telah mempercepat pertumbuhan Pembelajaran Bahasa Berbantuan Seluler (*Mobile Assisted Language Learning*/MALL), dengan Duolingo sebagai salah satu aplikasi pembelajaran bahasa berbasis gamifikasi yang paling populer. Studi ini menganalisis semiotika visual elemen gamifikasi dalam antarmuka Duolingo Jerman (versi 2022–2025). Pendekatan kualitatif deskriptif dengan desain studi kasus digunakan. Data terdiri dari tangkapan layar elemen gamifikasi (XP, streak, lencana, papan peringkat, maskot, dan animasi umpan balik) dan literatur terkait, yang dianalisis menggunakan semiotika Roland Barthes, model komunikasi Shannon dan Weaver, dan Teori Penentuan Diri dalam kerangka sosiokultural. Temuan menunjukkan bahwa elemen gamifikasi visual membangun mitos tentang pembelajar ideal yang selalu produktif, konsisten, dan kompetitif. Elemen-elemen ini memiliki efek motivasi ganda: mereka dapat memperkuat dan melemahkan kebutuhan akan kompetensi, otonomi, dan keterkaitan, tergantung pada konteks budaya dan pemahaman makna pengguna. Studi ini memperkaya semiotika visual dan penelitian pembelajaran bahasa yang digamifikasi, serta menawarkan rekomendasi UI/UX bagi pengembang dan pendidik untuk merancang pengalaman belajar yang lebih humanistik dan bermakna.

Kata kunci: *Duolingo, gamifikasi, semiotika Roland Barthes, motivasi belajar, Pembelajaran Bahasa dengan Bantuan Perangkat Seluler, UI/UX.*

Abstract

The advancement of digital technology has accelerated the growth of Mobile Assisted Language Learning *(MALL), with Duolingo as one of the most popular gamified language-learning applications. This study analyzes the visual semiotics of gamification elements in the Duolingo German interface (versions 2022–2025). A descriptive qualitative approach with a case study design is employed. Data consist of screenshots of gamification elements (XP, streak, badges, leaderboard, mascot, and feedback animations) and related literature, analyzed using Roland Barthes' semiotics, the Shannon and Weaver communication model, and* Self Determination Theory *within a sociocultural framework. The findings show that visual gamification elements construct the myth of an ideal learner who is always productive, consistent, and competitive. These elements have a dual motivational effect: they can both strengthen and undermine the needs for competence, autonomy, and relatedness, depending on users' cultural context and meaning-making. The study enriches visual semiotics and gamified language learning research and offers UI/UX recommendations for developers and educators to design more humanistic and meaningful learning experiences.*

Keyword*: Duolingo, gamification, Roland Barthes semiotics, learning motivation, Mobile Assisted Language Learning, UI/UX*

1. INTRODUCTION

Pendahuluan The development of information and communication technology has driven the emergence of *Mobile Assisted Language Learning* (MALL), with Duolingo as one of the most widely used gamification-based applications in the world (Liu et al., 2025). The integration of points (XP), leaderboards, badges, and the "Duo" mascot not only sustains user engagement, but also constructs a visual semiotic order that shapes how learners interpret achievement, motivation, and their learning identities. Various studies indicate that gamification in Duolingo increases enjoyment and willingness to continue, but this is not always accompanied by significant gains in cognitive outcomes and is regarded as less effective for grammatical aspects than other platforms such as Babbel (Shortt et al., 2021). A netnographic study of Duolingo communities for German and Spanish also reveals differences in users' beliefs and experiences that are influenced by intercultural contexts (Neuschafer, 2022). These findings highlight the need for a visual semiotic analysis that combines Barthes' theory, communication models, sociocultural theory, *and Self Determination Theory* to explain how visual gamification elements in the German Duolingo interface produce meaning, shape motivation, and represent cultural learning practices in digital environments.

Research Questions (RQs)

RQ1. How do Duolingo's core gamification artefacts (e.g., XP/progress, streaks, badges, leaderboards, and mascot feedback) construct denotation, connotation, and myth in the German course interface?

RQ2. How can these semiotic meanings be interpreted in relation to SDT needs (competence, autonomy, and relatedness) as supportive cues or as potential sources of pressure?

RQ3. What design implications follow for gamified language-learning applications to sustain engagement while remaining culturally sensitive and learner-centred?

The remainder of the paper presents the methodology, reports the semiotic and SDT-informed findings, discusses theoretical and practical implications, and closes with conclusions and limitations.

This article contributes a theory-informed reading of Duolingo's gamification interface by combining Barthes' visual semiotics with Self-Determination Theory (SDT) to explain how interface signs simultaneously motivate and discipline learners. The analysis also clarifies practical implications for gamified learning product design (UI/UX), especially how to preserve competence support while avoiding excessive performance pressure..

2. LITERATURE REVIEW

2.1 Mobile Assisted Language Learning (MALL) and the Rise of Gamified Language Apps

Mobile Assisted Language Learning (MALL) has become a dominant mode of informal and self-directed language study as smartphones enable frequent, short learning sessions and continuous access to materials. Within this ecosystem, gamification has been widely adopted to sustain engagement, encourage repetition, and scaffold daily practice. In language-learning applications, gamification commonly appears through points, levels,

rewards, leaderboards, reminders, and streak systems that translate learning activities into visible progress and achievement cues. Recent meta-analytic and review-based studies in technology-enhanced education generally suggest that gamification can increase engagement and persistence, yet its influence on learning outcomes can vary across contexts, learner profiles, and instructional designs (e.g., Liu & Wang, 2023; Zeng et al., 2024). Therefore, evaluating gamified MALL requires attention not only to "whether it works," but also to how design features shape meaning, motivation, and learner identity during interaction.

2.2 Duolingo as a Gamified MALL System: Benefits, Limits, and Ongoing Debates

Duolingo is frequently discussed as a prominent example of gamified MALL because it integrates point systems (XP), badges, streaks, leagues, and animated feedback into core learning tasks. Prior literature indicates that the platform can promote enjoyment and continuation intentions, but findings about language gains and learning depth remain mixed, depending on measures and comparison platforms (e.g., Shortt et al., 2021; Kessler et al., 2023). Complementary qualitative work has also raised concerns about gamification misuse—when reward structures and competition begin to dominate learning goals, potentially encouraging superficial engagement or avoidance when pressure is perceived (Mogavi et al., 2022). As a result, the Duolingo case is useful for examining a central tension in gamified learning design: the same mechanics that promote persistence can also shift learners toward performance-oriented or extrinsically regulated patterns.

2.3 Visual Interface as Meaning-System: Why Semiotics Matters in Gamified Learning

Most evaluations of gamified MALL focus on outcomes, perceptions, or behavioral analytics. However, a platform like Duolingo is also a structured visual environment: icons, colors, counters, animations, and character expressions are not neutral decorations, but sign systems that cue what counts as progress, what emotions are appropriate, and how learners should position themselves. Visual semiotics is therefore relevant because it treats interface elements as "texts" that carry layers of meaning and social expectations. Semiotic approaches have been used to interpret meaning-making in cultural artifacts such as logos, public signs, and mediated communication, demonstrating that visuals often convey ideological assumptions through repeated symbols and familiar narratives (e.g., Jadou & Al Ghabra, 2021; Swandhani et al., 2023). In the context of gamified learning, semiotic analysis can reveal how "learning" is framed whether as mastery, productivity, competition, moral discipline, or social status through visual cues that may operate implicitly.

2.4 Roland Barthes' Semiotics: Denotation, Connotation, and Myth in Digital Interfaces

Roland Barthes' framework is particularly suitable for interface analysis because it distinguishes between:
1. **Denotation** (what is literally shown),
2. **Connotation** (associative meanings shaped by cultural codes), and
3. **Myth** (a naturalized narrative that makes certain values appear self-evident).

Applied to a gamified interface, denotation concerns what appears on-screen (e.g., a flame icon, a progress bar, a crown). Connotation concerns the cultural associations invoked (e.g., discipline, achievement, prestige). Myth concerns broader narratives that are normalized through repetition (e.g., "good learners never break streaks," or

"learning is validated by rank and numbers"). Barthes' model supports a systematic reading of how gamification elements can communicate norms about learning identity and success, beyond their immediate functional role. In other words, the interface can become a "micro-culture" where achievement symbols and feedback animations stabilize a particular common sense about learning.

2.5 Self-Determination Theory (SDT): Motivation, Need Support, and Need Frustration in Gamification

Self-Determination Theory (SDT) explains motivation through the satisfaction or frustration of three basic psychological needs: competence, autonomy, and relatedness. In language learning, SDT has been used to interpret how learning environments foster self-regulation and sustained engagement when learners experience progress, agency, and social connection (e.g., Mynard & Shelton-Strong, 2022). In digital learning settings, SDT-oriented studies also emphasize that supportive feedback and social support can strengthen engagement, whereas controlling cues or excessive evaluation can undermine autonomy and shift learners toward externally regulated participation (e.g., Yang et al., 2025).

Gamification features can work in both directions. Clear progress indicators and informative feedback may support competence, while adjustable goals and flexible pathways may support autonomy. Yet, streak systems and public rankings can also be experienced as obligation, social comparison pressure, or fear of loss—conditions that may frustrate autonomy or relatedness for some users. Thus, SDT is useful not only for celebrating motivational benefits of gamification, but also for explaining why certain designs are effective for some learners while discouraging others.

2.6 Communication and Sociocultural Perspectives: Interface Messages and Contextual Meaning-Making

A complementary lens is to view gamified interfaces as communication systems: visual cues function as messages sent by the platform to the learner, and interpretation may vary depending on attention, prior experiences, and cultural background. The Shannon–Weaver model helps conceptualize how messages can be distorted through "noise," including semantic noise when a learner's interpretation differs from designers' intended motivational meaning (Syahputra & Kholil, 2024). In addition, sociocultural perspectives emphasize that learning and meaning-making are mediated by cultural tools and social practices; therefore, gamification signs may be negotiated differently across communities and contexts. Netnographic research on Duolingo communities suggests that intercultural differences can shape how users narrate their learning experiences and needs (Neuschafer, 2022). This is important for interpreting gamification not as a universal motivational formula, but as a design language whose meanings are socially situated.

2.7 Research Gap and Conceptual Positioning of the Present Study

Existing Duolingo research has contributed important evidence about user experience, engagement patterns, and in some cases learning gains; however, fewer studies examine Duolingo's gamification primarily as a visual meaning system that constructs learner identity and normalizes specific narratives about progress and success. Moreover, the motivational debate often remains at the level of outcomes, without detailing how interface signs produce motivational cues in the first place.

To address this gap, the present study positions Barthes' semiotics and SDT as complementary core frameworks:

semiotics explains how gamification artefacts construct denotation–connotation–myth, while SDT interprets how these meanings can support or frustrate competence, autonomy, and relatedness during interaction. Communication and sociocultural lenses are used as supporting perspectives to clarify that interface cues are interpreted as messages and that meanings may vary across contexts. Through this integrated framing, the study aims to advance a theory-informed understanding of Duolingo's gamified interface—especially in the German course context—while also deriving actionable UI/UX implications for learner-centred and culturally sensitive design.

3. Research Methodology

This study adopts a qualitative descriptive interpretive approach to examine how visual gamification elements in the Duolingo German course construct meaning, communicate messages, and relate to learner motivation in a Mobile Assisted Language Learning context. The methodological design is aligned with the research objectives, which focus on semiotic interpretation, not on statistical testing of learning outcomes.

3.1 Research Type and Design

This study focuses on the analysis of visual gamification elements in the Duolingo German application, specifically in the 2022–2025 interface period. The object of study is limited to visual signs that appear in the interface, such as icons, colors, animations, leaderboards, achievement badges, and the "Duo" mascot, which function as a system of digital signs. These elements are understood to play an important role in shaping users' perceptions, motivation, and learning experiences, as indicated by various studies on *mobile assisted language learning* (MALL), gamification, and the use of Duolingo in language learning.

This is a qualitative study with a descriptive–interpretive approach focusing on the meaning of visual signs in Duolingo German gamification elements. The study is positioned as qualitative research that produces an in-depth description of the semiotic meanings of visual gamification elements, their relationship to learning motivation based on *Self Determination Theory* (SDT), and the role of users' cultural context in meaning-making, without measuring learning outcomes quantitatively.

The research design is a qualitative case study with a single object, namely visual gamification elements in the Duolingo mobile application for German in the 2022–2025 version period. The main data consist of screenshots of visual gamification elements appearing in the Duolingo German interface (XP icons, streak indicators, badges, leaderboards, mascot, feedback animations, and progress representations). These visual data are then analyzed using Roland Barthes' semiotics, the Shannon and Weaver communication model, and the *Self Determination Theory* (SDT) framework. The design is aligned with the research questions, which highlight the analysis of visual signs, their influence on learning motivation, and the role of cultural context, and is consistent with the research boundaries that focus on visual aspects rather than cognitive outcomes or language proficiency.

3.2 Research Subjects and Objects

In this qualitative study with a visual semiotic approach, the research subject is not individual respondents but the visual signs and meanings constructed through gamification elements in the Duolingo German interface. In other words, the primary subject of the study is the "sign" itself, as is common in Barthesian semiotic research on literary texts, advertisements,

or logos, where texts or images are treated as subjects of meaning interpretation.

The object of this research is the visual gamification elements in the Duolingo mobile application for German in the 2022–2025 version range. These elements include, but are not limited to, icons and symbols related to points and progress (XP icons, hearts/lives, rewards, levels), progress indicators (paths, progress bars, levels, visual course structure), visual reward elements (badges, trophies, completion screens), competitive visual elements (leaderboards, league displays, ranks, statistics), representations of the "Duo" mascot in various poses and expressions, and feedback animations that appear when answers are correct or incorrect, when a streak is maintained or almost lost, and when users gain or lose XP.

3.3 Methods and Data Collection Techniques

In line with the qualitative descriptive–interpretive design and focus on visual semiotic analysis, this study uses two types of data sources: primary and secondary data. Primary data consist of screenshots of visual gamification elements in the Duolingo German mobile application (2022–2025). Secondary data consist of documents and relevant literature, including international and national journal articles on Duolingo, MALL, gamification, learning motivation, Roland Barthes' semiotics, the Shannon and Weaver communication model, *Self Determination Theory* (SDT), and the cultural context of language learners.

Data collection methods include documentation and library research, combined with indirect observation of the application interface. Documentation is used to collect visual data in the form of screenshots of gamification elements in Duolingo German. Library research is used to collect secondary data from journal articles, books, and other scholarly sources. Indirect observation is conducted through the researcher's own use of Duolingo German to understand the context in which visual elements appear.

3.3.1 Data Corpus and Sampling Strategy

Primary data consisted of a corpus of interface screenshots captured from the Duolingo mobile application (German course) across versions released in the 2022–2025 period. Screens were purposively sampled to represent recurring user journeys where gamification signs are salient: (1) lesson completion with correctness feedback, (2) speaking/vocabulary exercises with progress indicators, (3) reward/celebration screens, and (4) streak and leaderboard displays. Four representative screenshots are reproduced as Figures 1–4, while additional captures were used to confirm pattern stability across screens and sessions.

The unit of analysis is the visual sign as it appears in the interface (icons, badges, bars, counters, mascot cues, and ranking displays), rather than individual users. No personal identifiers or user-generated content were collected; screenshots were taken from the researcher's own app session.

3.4 Data Analysis Techniques

The data analysis techniques are designed to answer the research questions on how visual signs in Duolingo German gamification elements are analyzed semiotically, how these visual meanings are related to learning motivation, and how cultural context shapes user experience. Analysis is conducted qualitatively with a descriptive interpretive approach, combining Roland Barthes' semiotic analysis, visual communication analysis using the Shannon and Weaver model, and motivational analysis using *Self Determination Theory* (SDT) in the

context of learning German through Duolingo.

3.4.1 Coding and Interpretation Procedure

Analysis followed an iterative coding cycle. First, each screenshot was catalogued and annotated to identify visible signifiers (colour cues, icons, counters, layout emphasis, and textual feedback). Second, Barthes' model was applied to code denotation (what is shown), connotation (associative meanings), and myth (the broader cultural narrative that naturalises a certain 'ideal learner' identity). Third, coded meanings were mapped to SDT needs—competence, autonomy, and relatedness—to interpret whether each sign primarily supports intrinsic motivation (e.g., informative feedback, mastery cues) or risks undermining it (e.g., excessive social comparison or streak pressure). Finally, interpretations were compared against relevant MALL and gamification literature to maintain analytic coherence.

To avoid an overextended theoretical scaffold, Barthes' semiotics and SDT are treated as the core analytic frames: semiotics explains meaning-making in interface signs, while SDT explains motivational consequences. Communication (Shannon–Weaver) and sociocultural perspectives are used as supporting lenses to interpret the interface as a message channel and to caution that meanings may be negotiated differently across contexts.

3.5 Research Instruments

In qualitative research, the main instrument is the researcher, who collects, selects, organizes, interprets, and concludes data based on the theoretical framework. In addition to the researcher as the primary instrument, this study also uses auxiliary instruments in the form of analytical worksheets and recording formats based on Roland Barthes' semiotics, the Shannon and Weaver communication model, and *Self Determination Theory* (SDT). These instruments are needed to ensure that the analysis of Duolingo German visual gamification elements is systematic, consistent, and traceable.

3.6. Trustworthiness and Ethical Considerations

Trustworthiness was strengthened through (1) a transparent audit trail (cataloguing each screenshot with date/context notes), (2) theory triangulation (Barthes + SDT, cross-checked with MALL/gamification studies), and (3) negative-case attention, noting signs that can function as both supportive feedback and as pressure depending on interpretation. Ethical care was taken by using only interface material from the researcher's own session, excluding personal data, and reproducing screenshots strictly for scholarly analysis and critique of design features.

4. RESULTS AND DISCUSSION

This section presents the results of the analysis of visual signs in the gamification elements of the Duolingo German application and their discussion in relation to communicative functions, learning motivation, and users' cultural context. The results and discussion are structured based on Roland Barthes' semiotics, the Shannon and Weaver communication model, and *Self Determination Theory (SDT).*

4.1 Findings

The findings of this study are presented in the form of descriptive interpretive accounts of the meanings of

visual signs in the gamification elements of the Duolingo German application, the communicative functions of these visual elements, and their relations to learning motivation and users' cultural context. The accounts are based on the analysis of screenshots of gamified visual elements that have been classified and analysed using Roland Barthes' semiotics, the Shannon and Weaver communication model, and *Self Determination Theory*.

Based on the documentation and classification of visual data, the gamification elements in the Duolingo German application can be grouped into several main artefacts representing the application's identity, learning progress, rewards, correction, learning consistency, and social competition. The elements in Table 4.1 show that the visual gamification system of Duolingo German is built through a combination of character identity (the Duo mascot), indicators of learning progress (XP and progress bar), markers of consistency (streak), rewards (badges and chest rewards), correction (correct and incorrect icons), and social competition (leaderboard). These visual artefacts form the basis of the semiotic, visual communication, and motivation analyses in the following subsections.

Table 1. Visual Gamification Artefacts in Duolingo German

No.	Visual Artefact	Visual Description	Gamification Function
1.	Duo mascot	Green owl mascot with friendly/expressive facial cues	Brand identity cue and motivational reminder
2.	Crown badge	Gold or purple crown icon awarded for milestones	Achievement reward and status signalling
3.	XP progress bar	Green progress bar with XP counter	Progress tracking and immediate

No.	Visual Artefact	Visual Description	Gamification Function
			performance feedback
4.	Streak flame icon	Orange flame icon with consecutive-day count	Habit reinforcement and consistency signalling
5.	Leaderboard display	Ranked list with avatars and league positions	Social comparison and competition
6.	Correct mark (✔)	Green checkmark displayed after a correct response	Positive reinforcement and confirmation
7.	Incorrect mark (✖)	Red cross displayed after an incorrect response	Error feedback and correction cue
8.	Reward chest	Golden treasure chest icon shown after completing tasks	Visual reward and reinforcement trigger

To contextualise these visual artefacts, several representative interface screens from Duolingo German are presented in Figures 1–4.
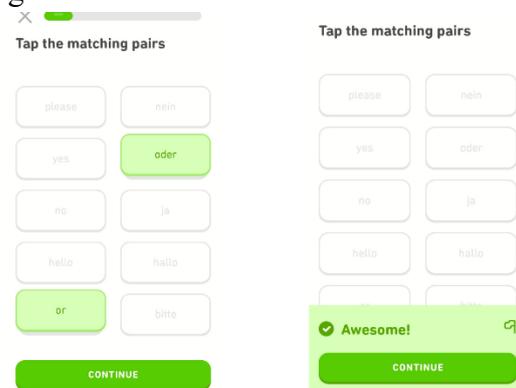

Figure 1. Vocabulary Exercise

Vocabulary exercise screen in Duolingo German using a "Tap the matching pairs" format with a progress bar and positive feedback when the user completes the task.
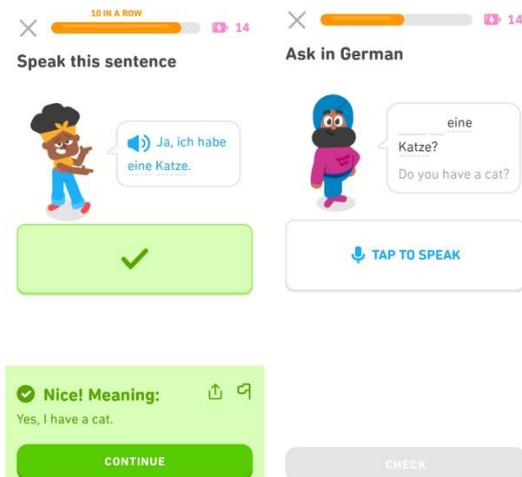
Figure 2. Speaking Exercise

Speaking exercise screen showing pronunciation tasks with immediate textual feedback ("Correct!", "Excellent!", "Nice!") and streak indicators such as "5 in a row" and "10 in a row".

Figure 3. Reward and Feedback Display

Reward and feedback screens displaying celebratory messages, total XP, success indicators, and daily rewards such as gems and streak freezes for consistent learning.
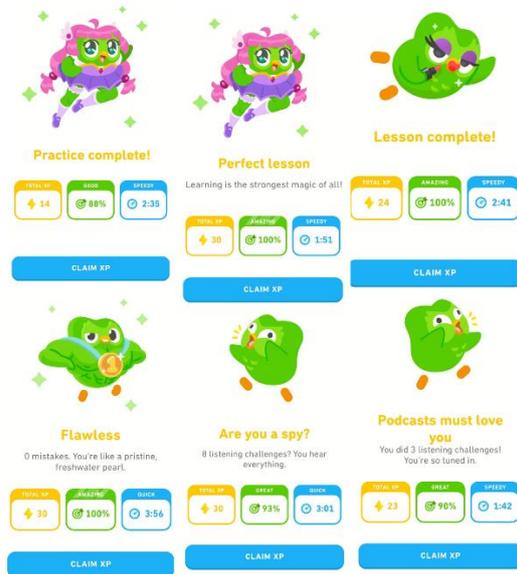
Figure 4. Streak Progress and
Leaderboard Display

Screens showing streak progress over consecutive days and the weekly leaderboard that visualises users' positions in the league as part of the social competition system.

To provide a transparent audit of interpretation, Table 2 summarises how core visual artefacts were decoded using Barthes' denotation–connotation–myth triad and then mapped to SDT needs as either supportive cues or potential sources of pressure.

Table 2. Semiotic decoding and SDT mapping of core gamification artefacts

Artefact	Denotation (what is shown)	Connotation (associative meaning)	Myth (naturalised narrative)	SDT reading (support / pressure)
XP progress bar	A green bar and XP counter that fills as tasks are completed.	Learning becomes measurable progress; 'doing more' equals 'doing better'.	The ideal learner is continuously productive and quantifiable.	Competence support (clear feedback); risk of pressure if treated as score-chasing.
Streak flame icon	A flame icon with a consecutive-day count and reminders.	Consistency is framed as moral commitment; missing a day implies failure.	Good learners are disciplined and always 'keep the streak alive'.	Can support habit formation; may undermine autonomy when experienced as obligation.
Crown badge / rewards	Badges, crowns, and chests shown after milestones or lesson completion.	Achievement and status are celebrated; rewards signal 'winning'.	Learning is a ladder of trophies; success is externally visible.	Competence reinforcement; risk of shifting motivation toward extrinsic rewards.
Leaderboard display	Ranked list with avatars, leagues, and positions.	Social comparison and competition; progress becomes relative to others.	Learning is a competitive arena; value equals rank.	Relatedness can be enabled via community; often introduces pressure and avoidance for some users.
Duo mascot feedback	Owl mascot with expressive cues and celebratory/error reactions.	A 'social' presence that nudges, praises, or warns; anthropomorphic coaching.	The app is a caring tutor watching your commitment.	Can strengthen relatedness and competence; may feel controlling if reminders are intrusive.

These descriptive screens and artefact inventories provide the empirical basis for interpretation. The next sub-section applies Barthes' semiotic model

and SDT to explain how the same interface signs can function as motivational support or as performance pressure, depending on how they are read.

4.2 Framework-based Analysis

Data analysis in this study is directed at three main objectives: analysing visual signs in the gamification elements of the Duolingo German application through a semiotic approach, identifying the influence of visual gamification elements on users' learning motivation, and examining the influence of cultural context on users' experiences in their interactions with visual gamification elements.

Roland Barthes' semiotic analysis of gamified visual elements shows that the visual system in Duolingo German is constructed as a chain of signs with layered meanings, ranging from denotation and connotation to myth. This semiotic analysis illustrates that visual signs in Duolingo's gamification elements do not merely convey functional information, but also construct a discourse of language learning as an activity that must be continuous, always measurable, full of symbolic achievements, and strongly competitive.

The analysis based on *Self Determination The*ory (SDT) shows that the visual gamification elements in Duolingo German are closely related to the fulfilment or obstruction of three basic psychological needs: competence, autonomy, and relatedness. Overall, the SDT analysis shows that these visual gamification elements have the potential to support learning motivation when visual signs are interpreted as support for competence, autonomy, and relatedness, and at the same time can lead to more

extrinsic forms of motivation when users interpret them primarily as performance demands and social pressure. The cultural context analysis shows that users' experiences with Duolingo German's visual gamification elements are influenced by their socio-cultural background and community dynamics. This analysis confirms that the influence of cultural context on users' experiences is reflected in how visual signs are received, negotiated, and interpreted.

4.3 Discussion

This discussion integrates the results of the analysis of visual signs in Duolingo German's gamification elements with Roland Barthes' semiotics, Self Determination Theory, communication theory, and the cultural context of learners. The semiotic analysis shows that the visual gamification elements in Duolingo German form a consistent "ecology of signs". The XP icon, progress bar, streak fire icon, badges, leaderboard, the "Duo" mascot, and feedback animations are not merely decorative components, but work as signs that construct particular ways of viewing language learning.

The findings on the semiotic meanings of visual elements are intertwined with motivational dynamics as explained by Self Determination Theory. The system of points, streaks, badges, and leaderboards has the potential to support competence, autonomy, and relatedness, but can also shift motivation towards more extrinsic forms if interpreted primarily as performance demands.

The sociocultural lens suggests that the meanings attached to gamification signs are not fully universal. While the interface promotes a relatively stable 'ideal learner' narrative, users may negotiate or resist these cues depending on their learning histories, social environments, and cultural values (e.g., comfort with competition, views on discipline, and attitudes toward public ranking). Because this study relies on interface screenshots rather than direct user interviews, cultural interpretation is presented as a theoretically grounded implication that should be validated with user-centred data in future research.

From a practical standpoint, these findings suggest that developers of language learning applications should be more careful in balancing the motivational functions and semiotic meanings of visual gamification elements. The XP, streak, badge, and leaderboard systems can be maintained as engagement drivers, but need to be balanced with clearer pedagogical feedback, visual designs that reduce excessive pressure, and the use of leaderboards that emphasise collaboration and support.

This discussion underscores that Duolingo German's visual gamification elements play an important role in shaping users' meanings, motivation, and experiences, while also opening up opportunities for design improvements so that language learning in digital contexts becomes more humanistic, reflective, and sensitive to learners' cultural diversity.

4.3 Managerial and Design Implications

For product and learning-experience management, the findings translate into concrete UI/UX guidance for balancing engagement and well-being:

- Personalise intensity: allow learners to reduce competitive cues (e.g., league visibility) and to set streak goals that match life constraints, supporting autonomy.
- Reframe progress as mastery: pair XP with mastery-oriented feedback (what improved, what to practise next) so competence is supported beyond point accumulation.
- Design 'soft failure' paths: when a streak breaks, emphasise recovery and learning continuity rather than loss, reducing shame/avoidance.
- Use social features for belonging: prefer cooperative challenges, peer encouragement, or small-group goals over rank-first leaderboards to strengthen relatedness.
- Mascot nudges with consent: keep reminders adjustable and transparent to avoid being perceived as controlling or surveillance-like.

4.4. Limitations and Future Research

This study is limited to a single application (Duolingo German) and to interface-level interpretation based on a screenshot corpus. Meanings were inferred from signs and supported by prior literature, but the study did not directly measure user motivation or learning outcomes. Future work can (1) triangulate semiotic findings with user interviews, experiments, or log data to test when signs are experienced as supportive versus pressuring; (2) compare

across languages, regions, or cultural settings; and (3) evaluate alternative designs such as cooperative leaderboards or mastery-based progress feedback.

.

5. Conclusion

This study shows that Duolingo's German-course interface operates as a structured system of visual signs. Across progress bars, streak indicators, badges, leaderboards, reward screens, and mascot feedback, the interface constructs layered meanings that frame language learning as measurable progress, consistent commitment, and—at times—social competition. Interpreted through SDT, the same signs can support competence (clear feedback and milestones) and relatedness (social presence), yet may also risk undermining autonomy when they are experienced as obligation, surveillance, or rank pressure. Accordingly, effective gamified learning design should emphasise mastery-oriented feedback, adjustable competition, and culturally sensitive interaction cues so that engagement is sustained without sacrificing learner agency;

6. Reference

Adam, S., Marfuah, M., Afifah, U. F., & Abdullah, A. (2024). Aplikasi gamifikasi pembelajaran bahasa Mandarin berbasis augmented reality. *Sistemasi: Jurnal Sistem Informasi, 13*(6), 2780–2788.

Alfarisi, T. A. A. (2021). Semiotika sebagai bentuk komunikasi bahasa dusta (studi kasus pelanggaran rambu-rambu lalu lintas di Surabaya). *Humanis, 13*(2), 143–150.

Alibakhshi, G., Zarei, M. A., & Labbafi, A. (2025). Digital video games and language learners' vocabulary learning, motivation and engagement: Teachers' perceptions of types and effectiveness. *Computer-Assisted Language Learning Electronic Journal (CALL-EJ), 26*(1), 94–113. https://doi.org/10.54855/callej.2526 16

Bader, M., Cloarec, M., Goumy, M., & Hussein, D. (2022). *The advantages and limits of gamification mechanisms: A Duolingo case study*. Paris Cité University.

British Educational Research Association. (2024). Issue information. *British Journal of Educational Technology, 55*(1), i–ii. https://doi.org/10.1111/bjet.13344

Jadou, S. H., & Al Ghabra, I. M. M. M. (2021). Barthes' semiotic theory and interpretation of signs. *International Journal of Research in Social Sciences & Humanities, 11*(3), 470–482. https://doi.org/10.37648/ijrssh.v11i 03.027

Kazu, İ. Y., & Kuvvetli, M. (2025). Digital language learning with Duolingo: Assessing its impact on listening, speaking, reading, and writing skills. *Journal of Computers in Education, 12*, 1–27. https://doi.org/10.1007/s40692-025-00355-0

Kessler, M., Loewen, S., & Gönülal, T. (2023). Mobile-assisted language learning with Babbel and Duolingo: Comparing L2 learning gains and user experience. *Computer Assisted Language Learning*, 1–25.

https://doi.org/10.1080/09588221.2023.2215294

Khuluq, M., Hasanah, M., Muasshomah, & Imamah, N. (2024). Mobile-assisted language learning apps: The analysis of Duolingo's content using ACTFL standarization. *Al-Ta'rib: Jurnal Ilmiah Program Studi Pendidikan Bahasa Arab IAIN Palangka Raya, 12*(2), 229–246. https://doi.org/10.23971/altarib.v12i2.8806

Kristensen, J. K., Torkildsen, J. V. K., & Andersson, B. (2024). Repeated mistakes in app-based language learning: Persistence and relation to learning gains. *Computers & Education, 210*, 104966. https://doi.org/10.1016/j.compedu.2023.104966

Liu, S., Zhang, S., & Dai, Y. (2025). Do mobile games improve language learning? A meta-analysis. *Computer Assisted Language Learning*. Advance online publication. https://doi.org/10.1080/09588221.2025.2528786

Liu, T.-Y., & Wang, Y.-C. (2023). The effects of gamification on EFL learners' motivation and academic achievement: A meta-analysis. *Journal of Educational Computing Research, 61*(3), 597–620. https://doi.org/10.1177/07356331231122345

Mauidloh, N. H., Anam, S., & Widyastuti, W. (2024). The correlation between student's engagement and reading comprehension while using Quizlet gamification for vocabulary learning. *IJORER: International Journal of Recent Educational Research, 5*(4), 1013–1025. https://doi.org/10.46245/ijorer.v5i4.650

Mogavi, R. H., Guo, B., Zhang, Y., Haq, E.-U., Hui, P., & Ma, X. (2022). When gamification spoils your learning: A qualitative case study of gamification misuse in a language-learning app. In *L@S '22: Proceedings of the Ninth ACM Conference on Learning at Scale* (pp. 1–14). Association for Computing Machinery. https://doi.org/10.1145/3491140.3528274

Mynard, J., & Shelton-Strong, S. J. (2022). Self-determination theory: A proposed framework for self-access language learning. *Journal for the Psychology of Language Learning, 4*(1), e414522. https://doi.org/10.52598/jpll/4/1/5

Neuschafer, T. (2022). A netnographic analysis of how Duolingo supports German and Spanish learning needs. *Digital Culture & Education, 14*(3), 1–15. https://www.digitalcultureandeducation.com/volume-14-3

Pratama, F. Y., Erviana, V. Y., Suwartini, I., & Antono, M. N. (2025). Gamifikasi dalam kelas Bahasa Indonesia bagi penutur asing (BIPA) anak. *Scholaria: Jurnal Pendidikan dan Kebudayaan, 15*(1), 60–67. https://doi.org/10.24246/j.js.2025.v15.i1.p60-67

Sadeghi, K., Sağlık, E., Mede, E., Samur, Y., & Comert, Z. (2022). The effects of implementing gamified instruction on vocabulary gain and motivation among language learners. *Heliyon, 8*(12), e11811.

https://doi.org/10.1016/j.heliyon.2022.e11811

Sergeeva, O. V., Zheltukhina, M. R., Ishmuradova, I. I., Kondakchian, N. A., Erokhova, N. S., & Zhdanov, S. P. (2025). A meta-analysis of the effectiveness of mobile supported collaborative learning. *Online Journal of Communication and Media Technologies, 15*(1), e202508. https://doi.org/10.30935/ojcmt/15948

Shortt, M., Tilak, S., Kuznetcova, I., Martens, B. C., & Akinkuolie, B. (2021). Gamification in mobile-assisted language learning: A systematic review of Duolingo literature from public release of 2012 to early 2020. *Computer Assisted Language Learning*. Advance online publication. https://doi.org/10.1080/09588221.2021.1933540

Sugiarto, A. F., & Qoiriah, A. (2022). Aplikasi pembelajaran Bahasa Indonesia berbasis web dengan pendekatan gamifikasi menggunakan algoritma Linear Congruent Method. *JINACS: Journal of Informatics and Computer Science, 3*(4), 435–445. https://doi.org/10.26740/jinacs.v3n04.p435-445

Swandhani, A. R., Wahjudi, D., & Lukitaningsih, L. (2023). Semiotika Roland Barthes sebagai pendekatan untuk mengkaji logo kantor pos. *Gorga: Jurnal Seni Rupa, 12*(1), 182–188. https://doi.org/10.24114/gr.v12i1.43650

Syahputra, R., & Kholil, S. (2024). Penerapan model Shannon and Weaver untuk mengurangi distorsi pesan dalam pengamanan Pemilu 2024 Deli Serdang. *Santhet: Jurnal Sejarah, Pendidikan dan Humaniora, 8*(2), 2126–2136.

Yang, Y., Chen, J., & Zhuang, X. (2025). Self-determination theory and the influence of social support, self-regulated learning, and flow experience on student learning engagement in self-directed e-learning. *Frontiers in Psychology, 16*, 1545980. https://doi.org/10.3389/fpsyg.2025.1545980

Zeng, J., Sun, D., Looi, C.-K., & Fan, A. C. W. (2024). Exploring the impact of gamification on students' academic performance: A comprehensive meta-analysis of studies from the year 2008 to 2023. *British Journal of Educational Technology, 55*(6), 2478–2502. https://doi.org/10.1111/bjet.13471