

THE BEHAVIOURIST MODEL AND COMMUNICATIVE COMPETENCE IN GAMIFIED LANGUAGE LEARNING

Azizova Makharam Rashitovna

Senior Lecturer, Department of Languages and Humanities
Andijan State Technical Institute

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Abstract. The study examines the discrepancy between the quantitative indicators of the spread of gamified applications for foreign language learning and their pedagogical effectiveness with regard to productive types of speech activity. The empirical base comprised statistical data from the Duolingo platform for 2025-2026, two systematic reviews, three meta-analyses for the period 2014-2023, and a series of experimental studies with samples ranging from 30 to 5071 participants. A comparative analysis showed that structural gamification produces a stable positive effect on vocabulary acquisition and user engagement, but is not statistically significant with respect to L2 reading self-efficacy and has not been evaluated in relation to spontaneous oral speech. The discrepancy is interpreted as a structural consequence of the behaviourist learning model underlying mass-market applications.

Keywords: gamification, communicative competence, behaviourist learning model, Duolingo, structural gamification, second language.

Introduction

By the middle of the 2020s, the mobile applications market for foreign language learning had reached indicators comparable to those of the largest segments of the digital education industry. The Duolingo platform reported 133 million monthly and 52.7 million daily active users at the end of the fourth quarter of 2025, with annual revenue exceeding one billion US dollars [1]. Such figures shape the perception that the gamified approach is methodologically sound and that the problem of mass language education in a digital format is on its way to being solved. At the same time, empirical research published in peer-reviewed journals records a divergence between the quantitative popularity of such applications and their capacity to develop learners' communicative competence in full.

A systematic review by Shortt and colleagues, covering more than sixty publications on Duolingo for the period from 2012 to 2020, noted the methodological heterogeneity of the research field and the dominance of studies measuring outcomes at the level of lexical productivity and basic grammatical structures [11]. Subsequent review studies confirm that the effectiveness of gamified tools in foreign language learning varies considerably and depends on audience characteristics, intervention duration, and the quality of methodological design. Nevertheless, teaching and student practice continues to rely on mass-market applications as a stand-alone instrument of language instruction.

The aim of the present study is to identify and theoretically explain the discrepancy between the prevalence of gamified language applications and their limited pedagogical effectiveness in relation to productive types of speech activity.

Materials and Methods

The study follows the logic of secondary analysis of quantitative and qualitative data obtained from peer-reviewed publications for the period 2014-2025. The empirical base comprises three meta-analytical works: the 2014 study by Hamari, Koivisto, and Sarsa covering 24 publications;

the 2020 meta-analysis by Sailer and Homner with a combined sample of more than 4,800 respondents; and the 2023 meta-analysis by Li, Ma, and Shi covering 41 studies and 5,071 participants. Two systematic reviews were drawn upon: the work of Shortt and colleagues on Duolingo and the review by Zhanni Luo on gamified tools in foreign language learning.

Additional material includes experimental studies: the 2012 work of Vesselinov and Grego on the comparative effectiveness of Duolingo and Rosetta Stone, the critical analysis by Krashen, a 2025 experiment with Chinese EFL students on Duolingo, the 2017 study by Medina and Hurtado and a 2025 study on the use of Kahoot in vocabulary instruction with tenth-grade learners, and the 2021 study by Waluyo and Bucol on Quizlet with a sample of 65 students at A1-A2 levels.

The comparative method was applied to correlate quantitative indicators of user engagement with indicators of measurable learning progress by type of speech activity. The systematisation of results was carried out along two axes: type of speech activity (receptive reading and listening skills, productive speaking and writing skills, lexical competence) and stability of the effect over time.

Results

Quantitative indicators of user engagement on gamified platforms remain consistently high. According to Duolingo's fourth-quarter 2025 data, the monthly audience reached 133 million users, with a daily audience of 52.7 million and annual revenue exceeding one billion US dollars. These figures testify to the effectiveness of the user retention mechanisms embedded in the application's design.

Meta-analytical estimates of the pedagogical effectiveness of gamification demonstrate a positive but moderate effect. The work of Sailer and Homner yielded an effect size of $g = 0.49$ for cognitive outcomes with a sample of 1,686 respondents, $g = 0.36$ for motivation with a sample of 2,246 respondents, and $g = 0.25$ for behaviour with a sample of 951 respondents [10]. The 2023 meta-analysis by Li, Ma, and Shi showed an overall effect size of $g = 0.822$ with a confidence interval from 0.567 to 1.078 [5]. The values obtained fall in the range from moderate to large effect according to the accepted classification; however, their interpretation requires consideration of sample characteristics and the quality of the underlying studies.

A 2025 experiment conducted with Chinese university-level EFL students measured the influence of Duolingo on reading skills and L2 reading self-efficacy. The results revealed no significant advantage of Duolingo over traditional methods in developing self-efficacy [2]. At the same time, learners reported increased motivation from gamified elements and were aware of the platform's limitations for developing coherent speech. The recorded mismatch between subjective engagement and objective gains in communicative competence forms a stable pattern also observed in other experimental studies.

With respect to Kahoot, the 2017 experiments of Medina and Hurtado and a series of more recent works recorded a statistically significant improvement in vocabulary test scores after a series of gamified quizzes [8]. None of the identified experimental studies measured learners' ability to produce extended monologic utterances beyond the multiple-choice format. The study by Waluyo and Bucol on Quizlet with 65 students at A1-A2 levels at Walailak University showed a statistically significant increase in vocabulary acquisition when comparing pre- and post-test scores after a five-week cycle of platform use [14].

The summary analysis of the results revealed a consistent discrepancy across categories of effect. Statistical significance is confirmed for lexical competence and user engagement. It is systematically not confirmed, or not measured at all, for spontaneous oral speech and productive writing.

Discussion

The picture obtained admits of a theoretical explanation through an analysis of the pedagogical model underlying mass-market gamified applications. Lotherington, in a critical analysis of four leading mobile platforms, showed that all four products teach through drills and rely on a structural conception of language and behaviourist principles of learning [6]. Mobility is used for marketing rather than pedagogical purposes. The learner performs uniform substitution exercises and receives points for them; however, the multiple-choice and substitution format does not reproduce situations of natural communication, in which fixed answer options are absent.

A 2024 analysis of Babbel, Memrise, and Duolingo, carried out through an adapted evaluation rubric, produced a more balanced picture [9]. The applications are recognised as methodologically sound at A1-B1 levels owing to offline functionality, goal-setting, and gamified elements. At B2 and higher levels, the instrumental potential of the platforms proves insufficient. This conclusion is consistent with the discrepancy identified in the quantitative results of the present study.

The structural nature of the discrepancy is explained by the difference between the business task of user retention and the pedagogical task of developing communicative competence. The business model, oriented toward the user's daily return, imposes no requirements on the actual development of language skills. The retention mechanics (streaks, leagues, variable reinforcement) are borrowed from the design of gambling games and social media and operate independently of the learning outcome. The pedagogical task is replaced by a behavioural one, and the measurement of success within the platform's metric system does not reflect real progress in communicative competence.

In his critical commentary on the 2012 data of Vesselinov and Grego, Krashen noted that the WebCAPE test used by the platform examines grammatical forms rather than communicative skills [4]. A high score in the application does not guarantee the learner's ability to engage in free oral communication. This gap between the metrics of success within the platform and real communicative competence represents one of the key methodological problems in assessing the effectiveness of gamified applications.

Conclusion

The analysis carried out has shown that gamified applications for foreign language learning effectively solve the task of initial motivation and automation of lexical competence at A1-B1 levels, but do not ensure the development of the learner's complete communicative competence. The discrepancy between the prevalence of the platforms and their pedagogical effectiveness is structural in nature and is explained by the dominance of the behaviourist learning model and the manipulative mechanics of user retention. A foreign language teacher should not view mass-market applications as a stand-alone instructional instrument. Their pedagogically justified place is that of a self-study trainer for the learner, supplementing but not replacing classroom practice in developing productive types of speech activity. Further research is best focused on developing empirically verifiable criteria for integrating digital platforms into blended formats of language instruction.

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