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A MOBILE APPLICATION FOR LEARNING FOREIGN LANGUAGES AS A SOLUTION FOR MICROLEARNING: APPLICATION CONCEPT AND GAMIFICATION TOOLS

Viktoriia Bytska, Vadym Ziuziun

Abstract. *The research considers the concept of a mobile application for studying foreign vocabulary, which is based on a combination of spaced repetition, microlearning and gamification as functional components of a single educational system. Existing approaches to studying foreign vocabulary are analysed and their main drawbacks are identified. Based on this, the conceptual principles of the application are formulated. Special attention is paid to the gamification system as a functional mechanism for supporting motivation and forming a sustainable habit of daily learning.*

Keywords: mobile application, vocabulary learning, spaced repetition, microlearning, gamification, personalization of learning

I. INTRODUCTION

The effective acquisition of vocabulary has always been and remains a residual factor in learning foreign languages, the latter being the basis for the development of speech skills. Without an adequate vocabulary base, it becomes challenging to comprehend texts, articulate ideas, or participate in meaningful interaction, thereby limiting the functional use of the target language. Traditional approaches to vocabulary learning, such as rote memorisation and dictionary-based exercises, often prove insufficient in ensuring long-term retention and sustained engagement. These methods often do not engage learners, provide little context for the use of words, and do not take into account individual learning styles or needs.

The rapid digitalization of education opens up new opportunities for developing innovative solutions in the field of foreign language learning. In particular, a promising direction is the creation of digital applications that combine interactive exercises, spaced repetition systems, and gamification tools. According to the research, «The Influence of Gamification on English Vocabulary Retention in Online Learning Platforms» [0], the introduction of game-based learning strategies, particularly through interactive games and systematic exposure to new vocabulary, has a positive effect on the acquisition of new words for English as L2 learners. Her findings suggest that this approach not only yields positive results in the context of vocabulary memorisation, but also increases the level of motivation.

Moreover, the integration of digital learning environments aligns with contemporary patterns of information consumption and professional development, where technology-mediated learning has become an integral part of everyday practice. As a result, digitally supported vocabulary acquisition represents not only a methodological innovation but also a response to broader socio-technological changes in modern education.

II. APPLICATION CONCEPT

The main idea is to create a mobile application that combines the principles of spaced repetition, contextual learning and microlearning in a single daily practice. There are many similar solutions on the market, but most of them either overload the user with content and functionality, or are reduced to simply viewing flashcards without a systematic logic of repetition. At this time, the proposed concept of the application is between these extremes, offering a clearly dosed daily

session, where the number of words is deliberately limited. It is planned not due to simplification, but as a methodological solution based on the principles of human memory.

The key difference of the application is that learning here is not a linear accumulation of new material. The repetition system is based on an algorithm according to which each word marked by the user as learned does not disappear from the learning process. It returns after certain intervals of time - at first more often, then less often, in accordance with the Ebbinghaus forgetting curve. The study «Enhancing Vocabulary Acquisition and Retention: The Role of Spaced Repetition in Language Learning» [0], conducted at a Thai university with the participation of 30 students who studied 104 words for a month using a structured interval repetition schedule, recorded a significant increase in the average score from 11.57 to 21.93 points, and the level of vocabulary retention after completing the practice remained at about 79%, which convincingly proves the effectiveness of spaced repetition as a method of long-term vocabulary acquisition and justifies its integration into the basis of the application's learning algorithm. It also ensures the transfer of vocabulary from short-term to long-term memory without the need to consciously plan repetition. Each session organically combines new words with a return to previously learned, and the words themselves are presented not in isolation, but through short situational contexts, which bring the learning process closer to natural language experience. The system automatically tracks which words need repetition, forming a personalized learning route without the need to manually configure anything.

Another feature of the application is the rethinking of the progress system, where instead of the standard CEFR A1-C2 level scale, the application uses metaphorical landmarks tied to real language situations, which makes progress tangible and motivating. Combined with passive contact with words through a widget and AI-supported pronunciation, this forms a holistic ecosystem of daily interaction with language not as a learning task, but as a habitual part of the day.

III. KEY ELEMENTS OF GAMIFICATION

Gamification in the context of mobile educational applications involves the integration of game mechanics into a non-migratory environment in order to increase user engagement and maintain their motivation to regularly interact with content. Within the application, it is planned to implement gamification not as a decorative element, but as a functional system, each component of which performs a specific role in the learning process. The table below lists the key gamification elements, their functional purpose, method of implementation, and priority in development (Table 1).

IV. INTENDED OUTCOMES AND USER BENEFITS

The implementation of the application is aimed at achieving a comprehensive result in which methodological efficiency, user experience and technological component work as a single system.

1. *Vocabulary growth.* The main measurable result is the user's assimilation of at least 150 lexical units per month – an indicator achievable thanks to daily structured sessions of seven words, an interval repetition algorithm and regular knowledge testing through exercises and tests. In addition, the result is planned to be achieved without the need to allocate significant time or exert excessive effort, because the microformat of learning allows you to build it into the usual rhythm of the day without feeling burdened.
2. *Pronunciation development.* A separate expected result is the improvement of the user's pronunciation. The integration of AI-sounding and the function of recording your own pronunciation allows the user not only to memorize words visually, but also to form correct phonetic patterns from the first stages of learning. In combination with contextual examples of use, this ensures the assimilation of the word in full.

3. *Sustained motivation and habit formation.* An equally important result is a qualitative change in the user's attitude towards the learning process. Most people who try to learn a language on their own do not face a lack of resources, but a lack of motivation and regularity. That is why the gamification system is built in such a way as to maintain engagement not through one-time bursts of interest, but through the formation of a stable habit. Streak mechanics, a multi-level reward system for different types of achievements, and visualization of progress through metaphorical levels create an environment in which the user receives positive reinforcement at each stage, regardless of whether he has just started learning or already has a significant vocabulary.
4. *Personalized learning experience.* In parallel with the motivational dimension, the application is planned to provide deep personalization of the learning process. The ability to choose thematic categories, level of difficulty, and form his own word lists allows each user to adapt the application to specific goals. The repetition algorithm automatically takes into account individual progress, determining which words need additional consolidation and which can be postponed for a longer interval. So each user's learning path is unique, even if the initial content is the same.

Table 1. *Planned gamification elements in the system*

Gamification element	The goal is to engage the user in learning in the app	Method of implementation	Development priority
Daily limit «7 words per day» (5 new + 2 for repetition)	Forming a habit of regular study and preventing overload	Automatic daily word updates; includes 5 new words and 2 for review; words are selected based on previous mistakes and user level	1
Flashcards with mini-context	Improving memory through associations and contextual learning	The card contains a word, translation, short sentence/situation; flip button; ability to listen to pronunciation; difficulty adaptation to the user's level	2
Interactive tests	Reinforcing the material and supporting active participation	Exercises like: match the word and the meaning, fill in the blank, choose the correct option; automatic grading; hints for errors	1
Weekly and monthly tests	Motivation for long-term learning and self-assessment of progress	Automatic generation of tests based on words marked as «studied»; various types of questions; user progress statistics; results notification	2
Streak system (series of days without gaps)	Forming a stable study habit and daily activity	Counter of consecutive days without gaps; visualization of the series (strip) in the form of a graph; reminder about gaps; integration with the application calendar	2
Rewards and achievements system	Increased intrinsic motivation and a sense of progress	Badges and achievements: 3 days without missing, repeated old words, passed weekly test; visual effects; notification about receiving an award	3
Personal word lists	Individualizing learning and increasing engagement	Ability to create personal word lists; training of individual lists; repetition statistics; integration with daily plan	3
Creative levels (instead of A1-C2)	Creating emotional attachment and a sense of accomplishment	Levels: Podcast Listener (500 words), Netflix Watcher (1000 words), Book Reader (2000 words); progress display; motivational messages	4

Thus, the application will represent a personal environment for the systematic and conscious development of lexical competence, accessible at any time and adapted to the real needs of the modern user.

V. DISCUSSIONS AND CONCLUSION

The research considers the concept of a mobile application for learning foreign vocabulary, which is based on scientifically sound methods – spaced repetition, microlearning and contextual word learning. The existing approaches to learning vocabulary are analysed and their main shortcomings are identified: the lack of a systematic logic of repetition, a low level of user involvement and ignoring individual needs. Based on this, the conceptual principles of the application are formulated, which occupies an intermediate position between platforms overloaded with functionality and simple sets of flash cards.

Special attention is paid to the gamification system, which is considered as a functional mechanism for supporting motivation. The article describes specific game mechanics and determines their role in forming a sustainable habit of daily learning.

The expected results and value for the user include both quantitative indicators (mastering at least 150 lexical units per month) and qualitative changes (development of pronunciation, formation of motivation and personalization of the learning process). It is concluded that the integration of the interval repetition algorithm, gamification and microformat of learning into a single ecosystem allows creating an effective environment for the systematic development of lexical competence in the conditions of modern digital education.

REFERENCES

1. Arif U. Q. (2025), «The Influence of Gamification on English Vocabulary Retention in Online Learning Platforms», *Jurnal Pendidikan dan Pembelajaran Indonesia (JPPI)*, vol. 5, no. 2, pp. 1044-1053, doi: 10.53299/jppi.v5i2.1468.
2. Saksittanupab P. (2024), «Enhancing Vocabulary Acquisition and Retention: The Role of Spaced Repetition in Language Learning», *Journal of Modern Learning Development*, vol. 9, no. 5, pp. 205-215. URL: <https://so06.tci-thaijo.org/index.php/jomld/article/view/273598>



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