QO‘QON DAVLAT PEDAGOGIKA INSTITUTI ILMIY XABARLARI
(2026-yil 10-son)

PEDAGOGIKA
PEDAGOGY

https://doi.org/10.70728/c.series.ped.v08.i10.129

MOBILE-ASSISTED LANGUAGE LEARNING AND LEXICAL DEVELOPMENT: EVIDENCE FROM DUOLINGO AND MEMRISE IN UZBEK EFL CONTEXTS

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Abstract Mobile applications are widely used for learning English vocabulary, yet comparative evidence from Uzbek EFL contexts remains limited. This study compared Duolingo and Memrise using a six-week pre-test/post-test design, questionnaires and interviews with learners and teachers. Both applications produced statistically significant vocabulary gains ($p < 0.05$). Memrise users improved by 34 percentage points and Duolingo users by 26, although the between-app difference was not significant. Relative vocabulary growth was largest among learners aged 10–14 (113%) and smallest among those aged 19–22 (66%), while absolute gains rose with age. Gamification, spaced repetition and learner autonomy were the factors most often credited with these results. The applications are best used as a supplement to teacher-led instruction.

Keywords: vocabulary acquisition, Duolingo, Memrise, EFL, gamification, spaced repetition, learner autonomy.

Annotatsiya Mobil ilovalar ingliz tili lug‘atini o‘rganishda keng qo‘llanilmoqda, biroq o‘zbek EFL (chet tili sifatida ingliz tili) sharoitida qiyosiy dalillar hamon cheklangan. Ushbu tadqiqotda Duolingo va Memrise ilovalari olti haftalik dastlabki va yakuniy test dizayni, o‘quvchilar hamda o‘qituvchilar bilan o‘tkazilgan so‘rovnomalar va intervyular yordamida solishtirildi. Ikkala ilova ham lug‘at boyligida statistik jihatdan ahamiyatli o‘sishni ta’minladi ($p < 0,05$). Memrise foydalanuvchilari natijalarini 34 foiz punktga, Duolingo foydalanuvchilari esa 26 foiz punktga yaxshiladi, biroq ilovalar o‘rtasidagi farq ahamiyatli bo‘lmadi. Lug‘at boyligining nisbiy o‘sishi 10–14 yoshli o‘quvchilarda eng yuqori (113 %), 19–22 yoshlilarda eng past (66 %) bo‘ldi, mutlaq o‘sish esa yoshga qarab ortib bordi. Gamifikatsiya, intervalli takrorlash va o‘quvchi avtonomiyasi bu natijalarning asosiy omillari sifatida eng ko‘p tilga olindi. Ilovalardan o‘qituvchi rahbarligidagi ta’limni to‘ldiruvchi vosita sifatida foydalanish eng maqbul hisoblanadi.

Kalit so‘zlar: lug‘at o‘zlashtirish, Duolingo, Memrise, EFL, gamifikatsiya, intervalli takrorlash, o‘quvchi avtonomiyasi.

Аннотация. Мобильные приложения широко используются для изучения английской лексики, однако сравнительных данных, полученных в узбекском контексте обучения английскому как иностранному (EFL), остаётся недостаточно. В данном исследовании Duolingo и Memrise сравнивались с помощью шестинедельного дизайна с предварительным и итоговым тестированием, анкетирования и интервью с учащимися и преподавателями. Оба приложения обеспечили статистически значимый прирост словарного запаса ($p < 0,05$). Пользователи Memrise улучшили результат на 34 процентных пункта, а пользователи Duolingo — на 26, хотя различие между приложениями не было значимым. Относительный рост словарного запаса был наибольшим у учащихся 10–14 лет (113 %) и наименьшим у учащихся 19–22 лет (66 %), тогда как абсолютный прирост увеличивался с возрастом. Геймификация, интервальное повторение и автономность обучающихся чаще всего назывались факторами, объясняющими эти результаты. Приложения лучше всего использовать как дополнение к обучению под руководством преподавателя.

Ключевые слова: усвоение лексики, Duolingo, Memrise, EFL, геймификация, интервальное повторение, автономность обучающегося.

INTRODUCTION

Vocabulary knowledge underlies all four language skills, and insufficient vocabulary is a main obstacle for EFL learners [1, 2]. Acquiring words requires repeated exposure and meaningful use, which mobile-assisted language learning (MALL) can supply anytime and anywhere [2, 4]. Duolingo and Memrise are among the most popular applications: Duolingo combines vocabulary with grammar through short gamified lessons, whereas Memrise builds on spaced repetition, mnemonics and videos of native speakers, following the logic of the forgetting curve and spaced learning [3, 9]. Research reports encouraging outcomes for Duolingo [6], but also shows that the effects of gamification depend on context and on learners' motivation [8]. Few studies compare the two applications directly, and evidence from Uzbekistan is scarce. In addition, many applications are designed outside the field of second-language pedagogy, so teachers and learners need evidence to judge their value [4].

The aim of this study is to evaluate the effectiveness of Duolingo and Memrise for EFL vocabulary acquisition. It addresses four questions: (1) how effective are the applications; (2) what role do gamification and spaced repetition play; (3) how do they affect motivation and engagement; and (4) how do they promote learner autonomy.

METHODS AND MATERIALS

Design and participants. A mixed-methods design was adopted. Thirty EFL learners (CEFR A2–B1) from Fergana State University, KIUF and regional schools were randomly assigned to a Duolingo group ($n = 15$) or a Memrise group ($n = 15$). For the age analysis, the same learners were grouped into three age bands (10–14, 15–18 and 19–22 years; $n = 10$ each).

Instruments and procedure. Over six weeks, participants used their assigned application for at least 30 minutes daily, with weekly reminders, and avoided other vocabulary-learning methods. A 50-item vocabulary test (recognition, comprehension and application tasks) was

given before and after the intervention. A questionnaire collected learners’ perceptions of engagement and usability, and three practising EFL teachers from a school, a language centre and online tutoring were interviewed.

Analysis. Pre- and post-test scores were analysed with descriptive statistics and paired-sample t-tests; groups were compared with an independent t-test, and the relation between usage frequency and progress with Pearson’s r. Questionnaire and interview data were analysed thematically. Participation was voluntary and based on informed consent, and confidentiality was guaranteed.

RESULTS AND DISCUSSION

Vocabulary test scores. Both groups started from a similar baseline and improved significantly (paired t-test, $p < 0.05$). Memrise users gained 34 percentage points and Duolingo users 26 (Table 1, Fig. 1a); however, the independent t-test showed no statistically significant difference between the applications ($p > 0.05$). Usage frequency correlated moderately with progress ($r = 0.6$).

Table 1. Mean vocabulary test scores by application

Group	Pre-test (%)	Post-test (%)	Gain (pp)
Duolingo	45	71	26
Memrise	41	75	34

Results by age. Every one of the 30 participants increased their vocabulary (mean 37.4 to 67.2 words; paired $t(29) = 32.8$, $p < 0.001$). Relative growth fell with age (113%, 79% and 66%), whereas absolute gain rose from 24.6 to 35.0 words (Table 2, Fig. 1b, Fig. 2).

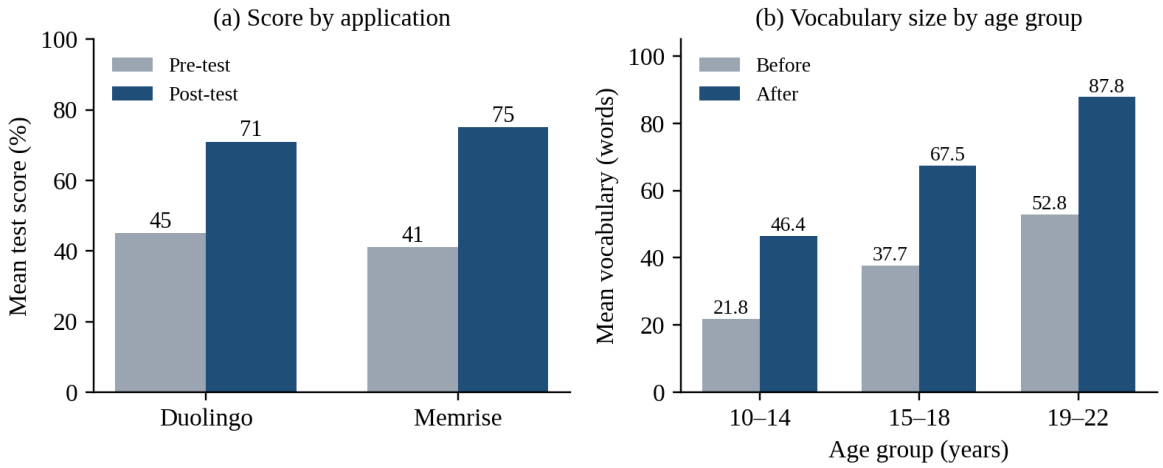


Figure 1. (a) Mean test scores before and after the intervention; (b) mean vocabulary size by age group.

Table 2. Vocabulary growth by age group (n = 10 per group)

Age (years)	Pre (words)	Post (words)	Gain (words)	Gain (%)	p (paired t)
10–14	21.8	46.4	24.6	113	< 0.001
15–18	37.7	67.5	29.8	79	< 0.001
19–22	52.8	87.8	35.0	66	< 0.001

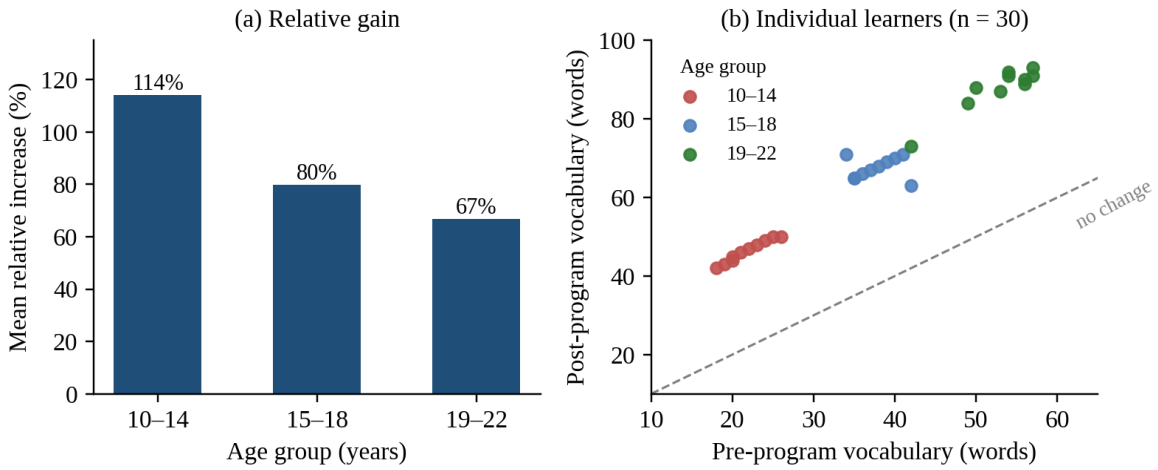


Figure 2. (a) Mean relative vocabulary increase; (b) pre- versus post-program vocabulary of individual learners.

Qualitative findings. More than 80% of respondents found points, streaks and rewards motivating. Both applications were rated user-friendly; Memrise was praised for thematic organisation and authentic videos, and Duolingo for its competitive, game-like format. Learners reported difficulty retaining rare words, and some asked for more speaking practice. The teacher interviews (Table 3) were largely consistent: all three named consistent daily use as the key condition of success, stressed that gamification works best together with repetition, and regarded self-paced study at home as a driver of learner autonomy and confidence.

Table 3. Main themes from teacher interviews

Theme	**Teachers’ view (n = 3)**
Effectiveness	Most effective for beginner to pre-intermediate learners; depends on consistent daily use.
Features	Spaced repetition supports recall; gamification brings learners back every day.
Motivation	Duolingo: streaks and competition; Memrise: native-speaker videos and real-life phrases.
Autonomy	Home study builds confidence, responsibility and self-directed habits.

The results confirm that both applications are effective tools for EFL vocabulary development. The significant gains agree with earlier reports on Duolingo [6] and on gamified learning [8], and with the view that repeated, spaced exposure supports retention [2, 3, 9]. The larger average gain of Memrise is consistent with its focus on spaced repetition and contextual video input, which relates to comprehensible input theory [10]. Because the difference between the applications was not significant, it should be interpreted cautiously; the choice of application should depend on learners’ goals, with Duolingo suited to structured, gamified practice and Memrise to contextual vocabulary retention.

The age pattern suggests that younger learners respond especially strongly to game-based formats, while older learners achieve larger absolute gains, probably because of greater autonomy, a larger starting vocabulary and more regular use. The correlation between usage

frequency and progress supports the teachers' view that consistency matters more than the application itself. Gamification alone is not sufficient, but together with spaced repetition it creates a positive feedback loop and a durable study habit, and the emphasis on self-paced study agrees with research on autonomous learning [7]. This agrees with the argument that game elements raise learners' willingness to practise regularly [8], while the risk of superficial learning remains if rewards replace understanding.

Practical implications. Teachers can assign short daily sessions in the applications as homework, use Duolingo-style activities with younger learners and Memrise-style contextual review for retention, and follow them with classroom tasks in which learners use the new words in speech and writing. Such a hybrid model combines the flexibility of the applications with the communicative authenticity that they cannot supply alone [5].

Limitations. The six-week period does not show long-term retention; the sample was drawn from a few institutions and from A2–B1 learners, and it is small (n = 30). Both applications focus on recognition and recall and offer little speaking or extended writing. Future studies should extend the duration, include more diverse samples, and test hybrid models that combine applications with classroom teaching.

CONCLUSION

Duolingo and Memrise significantly increased EFL learners' vocabulary across all age groups, with Memrise showing a somewhat higher, though statistically non-significant, advantage. Gamification, spaced repetition and flexible self-paced study explain much of their success. For best results, teachers should integrate the applications as a supplement to communicative classroom instruction, encourage daily use, and add productive speaking and writing tasks.

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