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Comprehensive assessment of CALL technologies for language instruction at higher education institutions

Evaluación exhaustiva de las tecnologías CALL para la enseñanza de idiomas en instituciones de educación superior

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Abstract

The ongoing transformation of higher education highlights the increasing importance of technology-enhanced learning. This study aims to evaluate the effectiveness of Computer-Assisted Language Learning (CALL) technologies in improving English language proficiency among students at Ukrainian universities and to assess their impact on student motivation and engagement. A mixed-methods approach was employed, combining a

survey of 120 students with an analytical t-test to identify correlations between CALL use and academic outcomes. The findings indicate that students in the experimental group who used CALL technologies performed significantly better than those in the control group, with an average score increase of 15.3 points and a 6.2-point advantage over the control group. The components “interest in the subject” and “intrinsic motivation” demonstrated the most notable improvements, reflecting deep learner engagement. Key benefits reported by students included enhanced motivation, immediate feedback, and flexible learning opportunities. Challenges identified were technical difficulties, lack of physical interaction, and the need for instructors to adapt to digital formats. The study concludes that CALL technologies contribute positively to language instruction, though further research is warranted to compare the relative effectiveness of specific platforms and tools.

Keywords: English language proficiency, digital learning tools, higher education in Ukraine, student motivation, CALL technologies.

Resumen

La transformación continua de la educación superior resalta la creciente importancia del aprendizaje mediado por tecnologías. Este estudio tiene como objetivo evaluar la eficacia de las tecnologías de aprendizaje de idiomas asistido por computadora (CALL) para mejorar la competencia en inglés entre estudiantes de universidades ucranianas, así como analizar su impacto en la motivación y el compromiso estudiantil. Se utilizó un enfoque mixto que combinó una encuesta a 120 estudiantes con una prueba t analítica para identificar correlaciones entre el uso de CALL y los resultados académicos. Los resultados indican que los estudiantes del grupo experimental que utilizaron tecnologías CALL obtuvieron un rendimiento significativamente mejor que los del grupo de control, con un aumento promedio de 15,3 puntos y una ventaja de 6,2 puntos sobre el grupo de control. Los componentes de “interés por la asignatura” y “motivación intrínseca” mostraron las mejoras más destacadas, lo que refleja un alto nivel de implicación. Los beneficios clave señalados incluyeron una mayor motivación, retroalimentación inmediata y flexibilidad en el aprendizaje. Los desafíos identificados fueron problemas técnicos, la falta de interacción física y la necesidad de adaptación docente a los entornos digitales. Se concluye que las tecnologías CALL contribuyen positivamente a la enseñanza de idiomas, aunque se requiere más investigación para comparar la eficacia de distintas plataformas.

Palabras clave: competencia en inglés, herramientas digitales de aprendizaje, educación superior en Ucrania, motivación estudiantil, tecnologías CALL.

Introduction

Proficiency in foreign languages is a critical component of successful academic and professional activity. This is especially relevant for the higher education system in Ukraine, which aspires to achieve deeper integration into the European and international educational landscape (Zavalniuk et al., 2021). Competence in a foreign language enables academic mobility, participation in international research projects, and professional advancement. Therefore, effective foreign language instruction is among the key priorities of Ukrainian higher education institutions. However, traditional teaching methods often lack the flexibility required in the current era of rapid digital transformation in education. These conventional approaches may fail to meet the expectations of contemporary students and can negatively affect their motivation and engagement. In this context, computer-assisted language learning (CALL) technologies, which include various online platforms, interactive software, mobile applications, and other digital tools, have gained significant attention (Kupchyk et al., 2025). These technologies offer new possibilities for personalizing instruction, enhancing the assimilation of learning material, and fostering learner autonomy. Furthermore, the integration of CALL into higher education is not only a pedagogical innovation but also a necessary response to persistent infrastructural constraints and motivational challenges within Ukrainian universities. These challenges mirror those encountered in Latin American countries, where the post-COVID-19 acceleration of digital transformation in education has revealed both new opportunities and systemic barriers (Davison & Joia, 2022; Deroncele-Acosta et al., 2023). For example, in Brazil, Colombia, Mexico or Peru, universities have introduced a wide range of ICT-based practical activities, often supported by regional cooperation initiatives with the European Union (Belli & Morín Nenoff, 2022; Siqueira, 2020). However, despite the progress, significant disparities persist due to uneven access to digital infrastructure and differentiated digital literacy among teachers and students (García-Martín & García-Sánchez, 2022;

Finardi et al., 2018). Latin American studies also highlight the need to contextualize CALL within larger frameworks of sustainable development, educational equity and social innovation (Cavalcanti-Bandos et al., 2021).

Research into the effectiveness of CALL technologies is particularly relevant for Ukrainian universities, some of which have limited access to modern technical equipment and need to implement innovative solutions to improve language training outcomes. In addition, the issue of student motivation remains relevant, as it largely determines success in learning a foreign language.

Accordingly, the aim of this study is to evaluate the effectiveness of CALL technologies in improving the level of English language proficiency among students at Ukrainian universities and to determine their impact on student motivation and engagement. The research questions are as follows:

1. How do CALL technologies affect students' academic performance in learning English?
2. How do CALL technologies affect students' motivation to learn English?
3. What are the advantages and disadvantages of using CALL technologies as perceived by students and teachers?

Theoretical Framework or Literature Review

The purpose of this review is to analyze existing research on the theoretical foundations of CALL technology and the effectiveness of its use. The review will also focus on identifying the main challenges to the integration of these technologies. A separate section will be devoted to gaps in the scientific literature.

Theoretical foundations of CALL: history and principles

The history of the use of Computer-Assisted Language Learning is actively discussed in contemporary works. In particular, some articles indicate that CALL emerged as an important educational trend in the 1960s and 1970s, along with the spread of computer technologies in education. The first approaches to CALL were behavioral and based on repetition and memorization exercises. In the 1980s and 1990s, a communicative paradigm emerged, which focused on the development of speech competence and interactive communication (Reyes Suárez & Arhire, 2025). Subsequently, an integrated model emerged, which aimed to unite various multimedia resources, Internet communication, and mobile applications. This integrated model is therefore aimed at involving different types of tools. As recent articles have shown, over the past decades, the concept of CALL has evolved from simple training programs to complex interactive systems that support communication, collaboration, and autonomous learning. Other studies indicate that CALL technologies currently consist of a variety of digital tools: learning platforms of different types (Moodle (LMS), Duolingo (language learning app), and Quizlet (study tool)), video conferencing (Zoom, Microsoft Teams), mobile applications, interactive games, and automatic writing correction systems. Some models also incorporate automation and AI technologies (Cavalcanti-Bandos et al., 2021). Modern CALL is based on several key pedagogical and technological principles that underpin the effective use of digital tools in language education. In particular, as has been proven, the principle of interactivity, which is a fundamental characteristic of CALL, is important. Unlike traditional passive teaching methods, CALL technologies provide dynamic interaction between the student and the learning environment. The principles of autonomy and personalization are also important. In particular, CALL technologies support the development of autonomous learning, as they allow students to independently choose the pace, duration, and content of their lessons (Canals & Al-Rawashdeh, 2018). At the same time, as proven in other works, one of the advantages of CALL is the ability to adapt the learning material to the level of knowledge, needs, and interests of a particular student. Modern systems allow you to form important adaptive learning paths, create personal accounts, track progress, and provide real-time feedback. At the same time, it is also worth considering the principles of multimodality and accessibility. As can be seen from the analysis of studies, CALL involves the use of different formats for presenting information – text, sound, video, images, and animation – which allows for different cognitive styles to be taken into account.

The effectiveness of CALL in higher education

Contemporary works demonstrate the importance of using CALL technologies, as they have a positive impact on student learning outcomes. According to meta-analyses, students who have been taught using digital technologies demonstrate better results in language proficiency tests, especially in listening comprehension, vocabulary, and writing. In addition, it has been proven that learning English in a CALL environment promotes the development of critical thinking and autonomous learning.

Some studies also emphasize the positive impact of these technologies on motivation (Banegas et al., 2020). In particular, it is noted that digital tools make learning more attractive and gamified, which is especially important for young audiences (Makarov et al., 2023). For example, studies have found that the use of mobile applications for vocabulary training increased both the regularity of classes and student engagement (Hudym et al., 2024; Davies, 2021). In addition, the use of CALL allows students to learn anytime, anywhere. This is especially important for students who combine study with work or live in regions with limited access to quality education. The flexible format promotes greater inclusiveness and reduces barriers to access to language education. However, research on CALL is still relatively limited in the Ukrainian scientific community (Zavalniuk et al., 2022). Nevertheless, some studies have pointed to a growing interest in digital language teaching methods (Christoforou et al., 2024; Ramírez-Romero & Sayer, 2016). This has become particularly noticeable since the transition to distance learning due to the COVID-19 pandemic and the full-scale Russian invasion. The authors drew attention to the potential of Moodle, Edmodo, and Google Classroom platforms for organizing an effective educational process. Some studies also demonstrated the importance of using various mobile applications for the development of communication skills.

The study by Hilliger et al. (2020) conducted a survey of students and teachers + interviews with the administration - using the example of universities in Chile and Ecuador and indicated the data collection practices and policies that influence the implementation of Learning Analytics. The results indicated that although there is previous experience, the lack of infrastructure and policies prevents the region from widely using analytics in education. The authors pointed out the importance of creating an innovative environment in the current educational institution. In addition, Okoye et al. (2023) and Mora (2022) conducted a systematic review of the impact of digital technologies in LATAM universities during the pandemic. The authors highlighted the importance of widespread adoption of ICT. In Latin America, Patiño et al. (2023) highlighted the importance of shaping open education within the framework of the Education 4.0 concept, which supports the development of complex thinking. The paper highlights the interaction between educational strategies, technologies and the translation of theory into practice. Rodríguez-Abitia et al. (2020) conducted a comparative study of digital inequalities in universities in Mexico and Spain. They used questionnaires and focus groups to identify problems of access to ICT, digital skills and develop recommendations for digital inclusion. Ruipérez-Valiente et al. (2022) highlighted the benefits of using open initial course platforms. In addition, the authors compared global and regional MOOCs and identified the main motivational factors influencing participation.

Challenges of implementing CALL

Despite numerous articles on the importance of using CALL, the implementation of this model is associated with a number of challenges. In particular, scientific works highlight both technical and specific pedagogical challenges. Among the technical limitations, the most notable are insufficient computer infrastructure, unstable internet, and outdated equipment, especially in regional universities. At the same time, pedagogical difficulties include insufficient digital literacy among teachers, a lack of appropriate methodological training, and a lack of motivation to use new approaches (Alam & Mohanty, 2022). In addition, as other studies show, there is currently a problem of unequal access to technology among students. This, in turn, may contribute to deepening educational inequality. Some studies indicate that not all students perceive digital learning as sufficiently “serious” or effective without the presence of a teacher. However, there are some shortcomings in the current review. In particular, despite some empirical studies, there is a lack of experimental and comparative articles in terms of methodology. In addition, most empirical

studies in the field of CALL focus on the Western education system: the US, the UK, and Japan. Studies from Latin America have highlighted the importance of using modern technologies for language learning, but also highlighted serious challenges. In particular, Okoye et al. (2023) conducted a systematic review of the impact of digital technologies in LATAM universities during the pandemic. The authors identified barriers such as low infrastructure, staffing, and financial constraints. They found widespread adoption of ICT, but uneven access and weak technical support hindered effectiveness. At the same time, Rodríguez-Abitia et al. (2020) conducted a comparative study of digital inequalities in higher education institutions in Mexico and Spain. They used questionnaires and focus groups to identify problems with access to ICT, digital skills, and to develop recommendations for digital inclusion. Salas-Pilco & Yang (2022) noted the main obstacles to the use of CALL technologies in Latin American universities—limited resources, staff training, and regulatory frameworks.

In Eastern European countries, particularly Ukraine, there is still a lack of research combining pedagogical and technical analysis of CALL use. There is a particular lack of thorough empirical assessments of the impact of CALL technologies on student motivation and academic achievement in higher education. Thus, the aim of this study was to fill the existing gaps and analyze the use of CALL in language training for students at Ukrainian higher education institutions.

Methodology

Research design

The study is empirical in nature and combines elements of a quantitative experiment with qualitative analysis. The main purpose of such a methodological design is to assess the effectiveness of CALL technologies in improving students' English proficiency, as well as to analyze the impact of these technologies on their motivation to learn a foreign language.

For this purpose, a quasi-experimental design was used with two groups: experimental (using CALL technologies) and control (traditional learning without digital tools). For a more detailed analysis of the main motivational aspects, qualitative data collection methods were also used - questionnaires and semi-structured interviews with students.

Such a mixed approach made it possible to cover both objective learning outcomes (by comparing pre- and post-test scores) and students' subjective perception of the learning process using technologies, which provides a holistic assessment of CALL in the context of higher education.

Participants

The study involved 120 second and third year full-time students of the Faculty of Foreign Languages of one of the state universities of Ukraine. All students studied English as a mandatory component of the curriculum according to a typical bachelor's degree program.

The purposive sampling method was used to form the sample. The main selection criteria:

Age of participants: from 18 to 20 years;
Level of English proficiency: from B1 to B2 on the CEFR scale (determined based on the results of preliminary diagnostic testing);
Previous experience: participants did not have significant experience using CALL technologies in language learning;

Gender balance: approximately the same number of men and women was ensured in each research group. After preliminary testing, all participants were divided into two subgroups of 60 people each:

Experimental group (n=60) – studied using CALL technologies;
Control group (n=60) – took the course using traditional methods (use of printed materials, classical teaching methods, without digital learning support tools).

Table 1.
Characteristics of the study sample

Indicator	Experimental group (n=60)	Control group (n=60)	Total (n=120)
Year of study			
– 2nd year	30	30	60
– 3rd year	30	30	60
Gender			
– Female	32	31	63
– Male	28	29	57
Average age (in years)	19,2	19,1	19,15
Level of English proficiency (CEFR)			
– B1	26	27	53
– B2	34	33	67
Previous experience with CALL			
– Yes	0	0	0
– No	60	60	120

Therefore, as can be seen from this table, the course of study is represented equally in both groups (30 students from each course), which ensures comparability of the academic level. The gender balance was generally observed: there were slightly more women in the sample (52.5%), which corresponds to the typical situation in pedagogical and language universities in Ukraine.

All students underwent the same procedure for preliminary information, signed an informed voluntary consent to participate in the study, familiarized themselves with its purpose, stages, duration and mechanisms for ensuring anonymity. Therefore, the study ensured the principles of anonymity and confidentiality.

Tools

CALL technologies

Several proven CALL platforms were implemented within the experimental training course. In particular, the capabilities of Duolingo were used to implement daily language exercises focused on vocabulary and grammar. The use of Quizlet was also envisaged for studying and repeating terms and phrases. Moodle served as the main platform for the course, hosting interactive exercises, self-study materials, and knowledge-testing tasks; systems such as BBC Learning English and YouGlish became important sources of authentic content and pronunciation examples.

The main assessment tools consisted of a language text and a motivation questionnaire.

The language test involved the implementation of standardized testing before and after the course for both groups. The test assessed the following skills: reading; listening; grammar and vocabulary; writing (short essay).

The overall score (100) allowed for comparison of participants' progress.

The motivation questionnaire was developed based on the Motivated Strategies for Learning Questionnaire

(MSLQ) scale, adapted for language learning. This questionnaire consisted of 20 statements in a Likert format (from 1 - “strongly disagree” to 5 - “strongly agree”). Such an instrument allowed to reveal interest in the subject, self-esteem, expected results, and strategic self-regulation.

The questionnaire included 20 statements covering the following components:

1. Interest in the subject (cognitive interest);
2. Expected success (belief in one’s own abilities);
3. Value of the task (awareness of the benefits of English);
4. Intrinsic/extrinsic motivation;
5. Learning self-regulation.

Semi-structured interviews were also conducted. They were conducted with 10 students of the experimental group and 3 teachers after the course. The aim was to find out the subjective perception of the implemented technologies, the assessment of benefits, difficulties and the level of involvement.

Research procedure

The study lasted 12 weeks (one academic semester) and took place in several stages.

At the preliminary stage, both groups were tested. This made it possible to assess the initial level of English proficiency. At this stage, the participants also filled out a motivation questionnaire.

The experimental group was instructed in the use of CALL platforms, installed the necessary applications. At the main stage, the experimental group used CALL technologies as part of weekly classes: part of homework, vocabulary and grammar trainers, audio and video materials. The control group worked with similar topics, but within the framework of traditional training (textbook, classical exercises, audio recordings on CD). An important fact was that the teachers of both groups worked according to the same curriculum. At the final stage, repeated language testing was carried out and a motivation questionnaire was filled out. Selected participants of the experimental group took part in an interview (duration – 15–20 min each), where they were additionally asked about their impressions of technologies. All data were encrypted to protect privacy.

Data analysis

The obtained quantitative data (test scores and motivation questionnaires) were analyzed using the SPSS program. For this, the following methods were used for analysis: t-test for independent samples. This made it possible to compare the mean scores of the control and experimental groups in pre- and post-testing, as well as motivational indicators; A t-test for dependent samples was also conducted, which affected the determination of internal progress in each group; A correlation analysis was also conducted to identify the relationship between the level of motivation and the results of the language test. Qualitative data from the interviews were processed using the thematic analysis method. Interview excerpts were manually coded, categories were formed (“technical difficulties”, “advantages of gamification”, “self-study”), and then the nature of mentions was analyzed. This combined approach made it possible to combine experimental methodology with elements of qualitative analysis, which influenced the objective assessment of the effectiveness of CALL technologies.

Results and Discussion

To determine the role of CALL technologies, preliminary (pre-experimental) and final (post-experimental) testing was conducted. Both groups – the experimental group (using CALL) and the control group (traditional learning) – took a test that included an assessment of four key language competencies: listening comprehension, reading comprehension, grammar and vocabulary, and writing (short essay). The

maximum score for the test was 100 (25 for each component). Both groups showed statistically significant improvement in academic performance after completing the 12-week course. However, the experimental group, which used CALL technology, showed significantly higher growth dynamics: from 66.2 to 81.5 points (+15.3). For comparison, the control group showed an increase of only +6.2 points (from 65.9 to 72.1). This generally indicated a noticeable impact of CALL technologies on improving students' English language proficiency (see Table 2).

Table 2.
Average scores before and after the experiment (by groups)

Group	Before test (M ± SD)	After test (M ± SD)	Change (Δ)	t-value	p-value
Experimental (n=60)	66.2 ± 6.8	81.5 ± 7.3	+15.3	14.97	< 0.001
Control (n=60)	65.9 ± 6.5	72.1 ± 6.9	+6.2	9.42	< 0.001

M - mean value; SD - standard deviation; t - Student's t-test for dependent samples; p - level of statistical significance.

Thus, both groups showed statistically significant improvement in academic performance after completing the 12-week course. However, the experimental group, which used CALL technologies, showed higher growth dynamics. To test intergroup differences, Student's t-test for independent samples was used. The result was $t = 6.73$, $p < 0.001$ for the comparison of post-test results between the experimental and control groups. This indicated that the difference in performance was statistically significant and not random.

There was a noticeable change in the results for individual language skills. The greatest improvement was observed in listening tasks (before the experiment: 16.5 ± 3; after 21.2 ± 2.8) and writing (before the experiment: 16.2 ± 2.9; after 20.3 ± 2.4). This can be explained by the active use of audio and video resources, digital simulators, and gamified exercises (Duolingo, BBC Learning English, interactive essays in Moodle).

The control group also improved their results, but the overall increase in all components was approximately half as much, and the written works showed lower variability in vocabulary and grammar.

Table 3.
Dynamics of results by language components (experimental group)

Component	Before (M ± SD)	After (M ± SD)	Change (Δ)	p-value
Listening	16.5 ± 3.0	21.2 ± 2.8	+4.7	< 0.001
Reading	17.0 ± 2.5	20.3 ± 2.6	+3.3	< 0.001
Grammar and Vocabulary	16.2 ± 2.9	19.7 ± 3.1	+3.5	< 0.001
Writing	16.5 ± 2.7	20.3 ± 2.4	+3.8	< 0.001

Therefore, these data indicate that CALL technologies have a positive impact on students' academic achievements. The combination of multimedia content, individualized learning opportunities, gamification, and feedback allows for the improvement of various communication skills.

To determine the level of motivation, participants filled out a special questionnaire twice: before the start of the experiment and after completing the 12-week course. Analysis of the questionnaire data showed some changes in the level of motivation of students in the experimental group compared to the control group. In particular, after completing the course, the average motivation score in the experimental group increased from 3.27 to 4.11 points (positive dynamics +0.84), while in the control group it increased only from 3.24 to 3.42 points (+0.18). Both increases are statistically significant ($p < 0.05$), but the degree of change in the experimental group is significantly higher ($t = 10.73$; $p < 0.001$). This, in turn, indicated a strong influence of CALL technologies on students' motivational factors (see Table 4).

Table 4.
Overall motivation level (before and after the course, arithmetic mean)

Group	Before the course (M ± SD)	After the course (M ± SD)	Δ Change	t-value	p-value
Experimental (n=60)	3.27 ± 0.41	4.11 ± 0.46	+0.84	10.73	< 0.001
Control (n=60)	3.24 ± 0.39	3.42 ± 0.36	+0.18	3.41	0.001

Δ — change in average motivation score; M — average value; SD — standard deviation

Analysis of the results obtained within the experimental group allowed us to assess the dynamics of individual components of motivation. The greatest increase was recorded in the category "interest in the subject" (+1.13 points). This indicated an increase in engagement in learning. Significant changes also occurred in indicators such as internal motivation and learning self-regulation, with an increase of +0.85 points. This information is consistent with the qualitative feedback from students, who noted that working with digital platforms was "interesting," "unusual," and gave them a sense of control over their own progress. This indicates the effectiveness of CALL in developing independence and a positive emotional background for learning.

Table 5.
Dynamics of motivation by main components (experimental group)

Motivation Component	Before the course (M ± SD)	After the course (M ± SD)	Δ change	p-value
Interest in the Subject	3.15 ± 0.50	4.28 ± 0.47	+1.13	< 0.001
Expected Performance	3.41 ± 0.48	4.01 ± 0.45	+0.60	< 0.001
Value of the Task	3.69 ± 0.43	4.24 ± 0.39	+0.55	< 0.001
Intrinsic Motivation	3.22 ± 0.46	4.07 ± 0.42	+0.85	< 0.001
Learning Self-Regulation	3.18 ± 0.44	4.03 ± 0.40	+0.85	< 0.001

Overall, the control group also showed a slight increase in overall motivation (+0.18 points on average), but none of the key components showed significant dynamics (all changes are within the standard error). Thus, traditional teaching methods do not provide noticeable emotional or cognitive reinforcement of student motivation, unlike CALL.

In order to determine the experience of interacting with CALL technologies, a questionnaire and semi-structured interviews were conducted with representatives of the experimental group. Students noted such advantages as interactivity and accessibility. In particular, student 43 noted that "Everything felt interesting. I did my homework with interest." Another student, 12, highlighted convenience: "I could do the exercises on my phone on the subway or between classes." Some individuals also noted the quick feedback: "The test immediately showed what I did wrong—it was very helpful" (Student 14), "It was very convenient that I received quick feedback" (Student 51). In addition, many applicants noted an increase in motivation. Among the disadvantages, students noted the overload of tasks from several platforms: "Sometimes it all merged into one, and it was not clear what was most important" (Student 17). Various technical limitations and the lack of live communication were also noted. Among the advantages, teachers pointed to an increase in student interest. Teachers noted that activity, feedback, and even attendance had increased. Automation of testing and individualization of learning also became important advantages. Among the disadvantages, it was noticeable that the preparation of materials required more time, and not all students were technically ready (see Table 6).

Table 6.
Advantages and disadvantages of CALL technologies as perceived by students and teachers

Criterion	Students	Educators
Advantages	- Interactivity and gamification - Flexible access - Autofeedback - Motivation	- Student activity increased - Automation of testing - Individualization of classes
Disadvantages	- Task overload - Technical difficulties - Lack of live communication	- Time spent on preparation - Technical unpreparedness of some students - Difficult to monitor implementation

Therefore, most students and teachers positively assessed their own experience using CALL technologies and recognized their effectiveness in increasing motivation and autonomy.

The main problem that prompted this study was the limitations of traditional methods of teaching foreign languages in higher education in Ukraine, which often did not meet the modern needs of the digital generation of students. The study assessed the real impact of CALL technologies on academic performance, motivation, and attitudes of participants. The results showed clear advantages and some disadvantages of using this approach.

The results of the study showed that the use of CALL technologies had a positive impact on the academic performance of students in the experimental group. In particular, the average score before the experiment in this group was 66.2 points (±6.8), and after 12 weeks of using CALL platforms, it was 81.5 points (±7.3). The increase was 15.3 points, which is statistically significant ($t = 10.73$; $p < 0.001$). In the control group, which was taught using traditional methods, the average score increased from 65.9 (±6.5) to 72.1 (±6.9), i.e., the increase was only 6.2 points ($t = 4.88$, $p < 0.001$). Thus, the growth in the experimental group is almost 2.5 times higher than in the control group. These data are confirmed by the conclusions of previous studies. Modern authors have pointed out that such indicators as interactivity and multimedia capabilities of CALL make it possible to improve the cognitive assimilation of language material (Moulin, 2024; Taridi et al., 2024). Our sample confirms that the greatest growth was demonstrated in listening (21.2 ± 2.8) and writing (20.3 ± 2.4) tasks. It was in these classes that students actively interacted with digital platforms. Some studies also emphasize the importance of using digital technologies for language learning, as they influence the interest of learners.

The study also analyzed changes in individual components of motivation among students in the experimental group before and after completing a 12-week course using CALL technologies. All indicators were assessed on a Likert scale from 1 to 5, where higher values indicated a stronger manifestation of the corresponding motivational aspect. The greatest growth was recorded in the “interest in the subject” component, where the average value increased from 3.15 (±0.50) to 4.28 (±0.47). This represents an increase of +1.13 points. This indicator points to an increase in students' interest in learning English because of the interactive approach and novel forms of teaching, which is generally consistent with other studies (Peungcharoenkun & Waluyo, 2023).

Significant growth is also noticeable in important components such as “internal motivation” and “learning self-regulation.” Both indicators increased by +0.85 points: internal motivation from 3.22 (±0.46) to 4.07 (±0.42), and learning self-regulation from 3.18 (±0.44) to 4.03 (±0.40). These data are generally consistent with other studies that have shown that CALL technologies can increase students' ability to independently control the learning process and increase their interest (Alavi et al., 2021; Banegas, 2021; Truba et al., 2023). Another notable aspect that improved as a result of the experiment was “expected success.” Its average score increased from 3.41 (±0.48) to 4.01 (±0.45), i.e., by +0.60 points. This means that students became more confident that they would be able to succeed in learning the language, which is also consistent with other studies (Salas-Pilco et al., 2022). All changes were statistically significant, with a p-value of less than 0.001. This confirmed the high reliability of the results obtained. Thus, as shown in other studies, CALL

technologies not only improve learning outcomes but also activate key motivational mechanisms (Bahari et al., 2025).

A survey of students and teachers conducted after the course indicated several advantages and disadvantages of using CALL in the process of learning English.

Among the advantages most often noted by students were increased motivation and interest, accessibility, interactivity, and automation. This corresponds to the conclusions of those authors who pointed out that the multimedia and interactive format of learning enhances engagement (Mundu et al., 2025). Similar results have been shown in other studies, in which the use of mobile applications has made it possible to increase student engagement in the learning process (Polyezhayev et al., 2024). Some studies also highlight other advantages not mentioned here. In particular, the studies conclude that CALL makes it possible to develop each competence in a targeted manner (Hasumi & Chiu, 2024).

However, along with the advantages, the participants of the experimental group also pointed out several problems that complicated the learning process. Technical difficulties, overload of tasks, lack of live communication became noticeable. Teachers also drew attention to the greater time spent on preparation and the difficulty of monitoring the completion of tasks. This also correlates with other works that pointed to similar challenges of integrating technologies into the learning process. Thus, the experience of using CALL in this study confirmed numerous international observations about its high effectiveness in increasing motivation and autonomy, but also identified some problems caused by infrastructural and pedagogical factors. Therefore, in the future, a positive effect will be achieved only with a systemic approach, that is, technologies should not replace teaching but be built into the methodology. Practical recommendations would be to provide broad institutional support for the involvement of CALL (Hasumi & Chiu, 2024; López, 2020). It is worth monitoring the proper technical level of universities in Ukraine. Significant attention should also be paid to updating curricula to integrate the CALL environment. In addition, it is worth conducting specialized training for teachers who would be directed to the CALL model.

However, this study has its limitations. A limited sample (only 120 students from one higher education institution) and a short duration of the experiment (12 weeks) are highlighted. In addition, the focus is only on English (without covering other languages). In future articles, it is recommended to expand the sample to include both students and teachers. An important direction will also be the implementation of a wide experiment involving different universities in Ukraine. In the future, the influence of external factors that were not controlled (parallel learning, living conditions) will also be considered.

Conclusions

This study aimed to evaluate the effectiveness of CALL technologies in teaching English in higher education in Ukraine, in particular their impact on academic performance, student motivation, and perceptions of the advantages and challenges of digital learning.

It was found that students in the experimental group who studied using CALL showed significantly higher results on the final test (an average increase of +15.3 points) compared to the control group (+6.2 points). The difference is statistically significant ($p < 0.001$).

The overall level of motivation in the experimental group increased from 3.27 to 4.11 points. The greatest increase was observed in the components “interest in the subject” (+1.13 points) and “internal motivation” (+0.85 points), which confirms the deep involvement of students in learning.

Among the main advantages, students noted flexibility in learning, instant feedback, and increased interest. Among the challenges were technical difficulties, lack of live contact, and the need for digital adaptation for teachers.

The study has practical significance for Ukrainian universities, as it offers a scientifically based model for implementing CALL in educational programs. In addition, this study identified a number of challenges that arise when implementing CALL. This article is also one of the few empirical studies in the contemporary Ukrainian context that combines quantitative and qualitative analysis of the impact of CALL technologies in language learning.

Further research could include comparing the effectiveness of different CALL platforms (e.g., LingQ, Memrise, or specialized LMS). In the future, the sample should also be expanded to include both students and teachers. Another important direction will be to conduct a large-scale experiment involving various universities in Ukraine. Another promising direction will be to assess the impact of CALL on knowledge retention (through follow-up testing after 3–6 months).

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