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Innovative Online Platforms in Foreign Language Teaching for Development and Assessment of Communicative and Intercultural Competence of Students in Higher Education

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Abstract

The aim of the study was to evaluate the effectiveness of the online platforms Duolingo, Padlet, Flip and Zoom in developing students' communicative and intercultural competence. To achieve this aim, the empirical methods were used: English language tests to assess communicative skills, Intercultural Sensitivity Scale to assess intercultural competence and questionnaires and surveys on students' perception of effectiveness of digital platforms. Statistical methods of analysis included an independent two-sample t-test, Pearson's correlation coefficient and effect size (Cohen's d). The results showed that the experimental group achieved significantly higher scores in communicative competence (3.85 ± 0.40) and intercultural competence (3.76 ± 0.42) compared to the control group (3.27 ± 0.48 and 3.30 ± 0.50, respectively), and, in the experimental group, an increase in competences exceeded 0.70 points for both variables and was statistically significant ($p < 0.001$). The analysis of student activity on the platforms showed that regular work with interactive tools directly correlates with the competence development. The results can be used by instructors to design interactive assignments tailored to the specific features of each platform, provide formative feedback and encourage students to work autonomously.

Keywords: online platforms, competence, interactive environment, English language, educational technologies, student motivation, intercultural communication

1. Introduction

Modern online platforms play a key role in foreign language teaching in higher education, providing a comprehensive learning environment for the development of communicative and intercultural competence. The most widely used services include Duolingo, Busuu, BBC Learning English, Moodle, Google Classroom, Padlet, Flip, Tandem, Zoom and MS Teams (Kazu & Kuvvetli, 2025), which facilitate interactive learning and active language practice (Lee & Roger, 2023). The functional capabilities of these platforms personalize learning process by adapting tasks to students' language proficiency levels and individual educational needs (Emon, 2026; Dong et al., 2024). This approach fosters the development of autonomy, intrinsic motivation and independent planning of learning activities.

Multi-modal presentation of learning materials (a combination of texts, audio and video clips, interactive exercises and visual elements) stimulates students' cognitive processes and promotes deeper mastery of lexical, grammatical, listening and reading skills (Balula et al., 2020; Mahfoodh & Hashim, 2021). Such cognitive foundation creates conditions for the transition from receptive processing of language material to its active use in communicative process. In this sense, online platforms facilitate foreign language interaction in real-life in both synchronous and asynchronous modes: video conferences, online discussions, group projects, chats and forums simulate authentic communicative situations and stimulate the development of oral and written communication (Shanzey & Zaheera, 2025).

The expansion of communicative interaction in the digital environment simultaneously opens up opportunities for developing intercultural competence, since communication in a foreign language increasingly takes place in a culturally diverse context. With platforms being internationally oriented, students interact with native speakers and representatives of other cultures, discussing social norms, cultural traditions and daily life. Such interactions foster the development of intercultural sensitivity, tolerance and cultural awareness, which are considered primary components of intercultural communicative competence in the context of a globalized educational space (Aldighrir & Asiri, 2025).

At the same time, the implementation of intercultural communication in digital format raises the issue of its pedagogical assessment, as the results of these interactions go beyond the scope of traditional language proficiency testing. In this context, online services provide effective tools for assessing learning outcomes through automated tests, interactive quizzes and speaking tasks with instant feedback (Alshammary & Alhalafawy, 2023). As teachers gain access to students' progress, task completion rates and common errors, they implement formative assessment and provide individualized pedagogical support (Elmabaredy & Gencel, 2024).

Despite the growing body of research on the digitalization of language education, the systematic use of online platforms for developing and assessing students' communicative and intercultural competence remains understudied. Most studies focus on technical aspects or individual tools, whereas the pedagogical impact of integrating platforms as a holistic educational environment requires empirical validation.

The aim of this study was to evaluate the effectiveness of the online platforms Duolingo, Padlet, Flip and Zoom in developing students' communicative and intercultural competence. To achieve this goal, the following tasks were established: to design a pedagogical model based on digital services for conducting an experiment; to organize the experiment using these platforms in the learning process; to assess the levels of students' communicative and intercultural competence; analyze the results and determine the pedagogical effect of using digital platforms.

The research hypothesis stated that systematic use of interactive platforms would enhance students' communicative and intercultural competence through interactive engagement, multi-modal content and formative assessment.

2. Literature Review

In modern language pedagogy, communicative and intercultural competence are viewed as interrelated yet conceptually distinct components of foreign language teaching. Communicative competence is traditionally defined as the ability to use a foreign language effectively according to linguistic norms and communicative situation, including linguistic, sociolinguistic, discourse and strategic components (Mukan et al., 2023). Its focus is primarily on the appropriateness of speech acts and the achievement of communicative goals.

In contrast, intercultural competence goes beyond linguistic correctness and involves the ability to interpret and produce speech while considering cultural differences, values, norms and behavioral patterns. In this context, intercultural sensitivity, tolerance, reflexivity and willingness to engage in dialogue with representatives of other cultures become crucial (Zabiyaka & Lobanova, 2020; Avgousti, 2018). Thus, intercultural competence is not limited to linguistic mastery but is linked to awareness of the cultural dimension of communication.

Digital platforms should be viewed not as a separate object of analysis but as an educational environment that creates conditions for the targeted development of both competencies. Recent studies demonstrate a growing interest in the use of digital platforms in foreign language teaching in universities. Amin and Paiman (2022) analyzed the experiences of university English teachers and found that interactive platforms increase students' engagement and enhance learning flexibility. The authors emphasize the importance of platform functionalities, particularly feedback tools and synchronous communication. Similarly, Estrella (2023), in a study on the effectiveness of digital platforms in Ecuador, noted that online services positively influence the development of language skills, particularly speaking and listening, and promote student autonomy.

There are various approaches to organizing digital learning. Arce and Valdivia (2020) investigated the implementation of platform gamification and demonstrated that game mechanics increase student motivation and encourage active participation in the learning process. Sofi-Karim et al. (2023) examined online education through media platforms and mobile apps, highlighting their flexibility, accessibility and learning personalization, as well as the importance of interactive tools for developing communicative skills. Moorhouse and Yan (2023) investigated the use of digital tools by English language teachers and found that the most effective platforms are those that support collaboration, video communication and rapid feedback.

The use of artificial intelligence occupies a special place in modern approaches to foreign language teaching, with its potential consisting not only of systematization of education but also of supporting the development of communicative and intercultural competence. Intelligent algorithms ensure the adaptive presentation of language material, considering students' language proficiency, communicative needs and typical errors, which facilitates targeted development of language skills in

real communicative contexts (Sun et al., 2021). At the same time, the use of AI in speaking and translation tasks simulate intercultural interaction, where students analyze cultural differences in speech behavior, stylistics and pragmatics, which directly influences the development of intercultural sensitivity and reflection (Wang, 2023).

Despite numerous studies on the digitalization of language education, a significant part of research focuses on the technical aspects of platforms or the general outcomes of language teaching, without assessing the comprehensive pedagogical impact on the development of communicative and intercultural competence. In particular, Mukan et al. (2023) emphasize the importance of communicative competence in foreign language teaching as the ability to communicate effectively in academic and professional settings. Zabiyaka and Lobanova (2020) note that intercultural competence is becoming the most prominent aspect in professional training in globalized education, while Kuzmenko (2025) argues that reflection significantly contributes to the development of intercultural sensitivity.

Thus, the analysis of the scientific discourse indicates the existence of effective platforms and functional mechanisms that support students' language activity and engagement. At the same time, the pedagogical impact of platforms as a holistic educational environment for fostering communicative and intercultural competence has not been systematically assessed. The issue of integrating digital services into curriculum, formative assessment mechanisms and students' reflective practices has been under-researched.

3. Methods and Materials

3.1 Research Procedure

The study was conducted using a quasi-experimental design with a control and an experimental group to assess the impact of online platforms on the development and assessment of students' communicative and intercultural competence. At the first stage, a pedagogical model for integrating platforms into the foreign language teaching was developed, including tools for interactive engagement and formative assessment (October 2025). At the second stage, experimental and control groups were formed and preliminary testing of communicative and intercultural competence levels was conducted (November 2025). For this purpose, pre-test was conducted using standardized instruments: the English Language Test (CEFR B1-B2) and the Intercultural Sensitivity Scale (ISS). At the third stage, the experiment was conducted using online platforms as an educational environment in the experimental group (November–December 2025). At the fourth stage, post-test of communicative and intercultural competence levels was conducted, data on learning outcomes and competence development were collected in both groups and a survey on students' attitudes toward the experience was carried out (January 2026). At the fifth stage, the collected data were analyzed using quantitative and qualitative methods to assess its pedagogical effect (February 2026).

3.1.1 Qualitative Data Collection and Analysis

The qualitative component was administered to the students in the experimental group (n = 60), who participated in the 12 instructional sessions involving Duolingo, Padlet, Flip and Zoom. Qualitative data were collected by the instructors (authors of the study), who observed students throughout the intervention and documented their communicative behaviour, peer interaction, intercultural reflection and autonomous learning behaviour. The qualitative dataset also included students' written Padlet posts and oral contributions produced during Flip presentations and Zoom discussions. Thus, the qualitative analysis concerned naturally occurring learning activities and artefacts produced by the 60 students in the experimental group rather than the control group.

The qualitative analysis followed a thematic procedure. After each instructional session, the instructors reviewed the observation notes and student artefacts and identified meaningful statements or episodes related to four predefined analytical dimensions: (1) communicative engagement, (2) interaction with peers, (3) intercultural reflection, and (4) autonomous learning behaviour. Recurring statements and episodes were subsequently grouped into these thematic categories. The analysis focused on the presence and characteristics of behaviours relevant to each theme rather than on numerical comparison between the groups. Representative verbal and written excerpts from students' Padlet posts, Flip presentations and Zoom discussions were selected to illustrate the identified themes. Participant quotations were anonymised using student codes.

The qualitative component was used to contextualise and explain the quantitative findings. In particular, the qualitative evidence helped identify the forms of interaction and learning behaviour through which the experimental students engaged with the digital platforms and developed communicative and intercultural competence. The qualitative findings were subsequently compared with the quantitative results to identify convergent patterns.

3.2 Sample

A total of 120 2- and 3-year students from higher education institutions participated in the study; their majors are related to linguistics and intercultural communication. The participants are represented by the following institutions: Department of English Language and English pedagogy, Faculty of Foreign Languages, Vinnytsia Mykhailo

Kotsiubynskyi State Pedagogical University; National University of Water and Environmental Management; Department of Foreign Languages, the Educational Scientific Institute of Foreign Languages, the Bohdan Khmelnytsky National University of Cherkasy; Department of Modern European Languages, State University of Trade and Economics / Kyiv National University of Trade and Economics; Department of Methods of Teaching Ukrainian and Foreign Languages and Literatures, Educational and Scientific Institute of Philology, Taras Shevchenko National University of Kyiv.

These institutions were selected based on their reputation in training foreign language professionals, the high level of digital infrastructure in education and their experience in integrating online platforms into teaching. Students aged 19–22 were chosen for their active participation in the learning process and their willingness to work with digital educational resources. The sample of 2- and 3-year students allows us to assess the development of communicative and intercultural competence during the stage of sequential development of professional and language skills. The students' majors included English and German philology, Applied Linguistics, Translation and Foreign Language Teaching Methodology.

Among the selected participants, 45% were male and 55% were female, which corresponds to the average gender composition of foreign language departments of Ukrainian universities. The selection criteria were: regular attendance, a basic level of foreign language proficiency (CEFR B1–B2) and willingness to participate in all stages of the experiment. The exclusion criteria were: irregular attendance, lack of a basic level of foreign language proficiency (below CEFR B1) and refusal to participate in any stage of the experiment. During the study, some students were excluded due to incomplete participation in classes or failure to complete platform assignments, which helped maintain data quality and reliability. The final composition of both groups consisted of 60 students each, which corresponded to the planned sample size and ensured the comparability of the results.

All participants were divided into an experimental and a control group of 60 students each, considering their initial proficiency level, major and year of study, to ensure the representativeness and comparability of the study results. To achieve this, a stratified random sampling was used: students were first grouped by major and year, and then randomly assigned to one of the groups. This approach ensured an even distribution of students from different majors and years across both groups and improved the representativeness and comparability of the study results.

All respondents were informed about study objectives, the format of participation and the option to withdraw at any stage; additionally, they provided written informed consent forms. The confidentiality of personal data was ensured in accordance with ethical standards for conducting scientific research.

3.3 Research Methods

To assess the pedagogical impact of using online platforms on the development of students' communicative and intercultural competence, a set of empirical and statistical methods was employed to systematically test the research hypothesis.

1. Testing

To assess the level of communicative competence, an English language test for evaluating oral and written speech (CEFR B1-B2) was used, which consisted of 30 tasks: 10 on listening, 10 on writing and 10 on grammar and vocabulary. Each task was graded on a 5-point scale, where 1 point corresponded to a low level and 5 points to a high level. The test was administered twice.

With Duolingo, students completed exercises on grammar, vocabulary and listening, which were automatically graded by the system and used for formative assessment. On Padlet, they completed writing tasks in the form of posts and comments evaluated by instructors (authors of this study) based on the expression quality and the use of intercultural content.

To assess intercultural sensitivity, the Intercultural Sensitivity Scale (ISS) was applied (Chen & Starosta, 2000), a 5-point Likert scale, consisting of 24 questions. The Intercultural Sensitivity Scale (ISS) assesses students' intercultural sensitivity across five factors. Interaction Engagement examines readiness and interest in communicating with representatives of other cultures, that is, the active pursuit of opportunities for intercultural interaction. Respect for Cultural Differences assesses attitudes toward cultural diversity, tolerance and openness to differences in values, traditions and behavior. Interaction Confidence evaluates the level of self-confidence and comfort in intercultural communication. Interaction Enjoyment deals with the emotional aspect of communication and the satisfaction derived from interacting with representatives of other cultures. Finally, Interaction Attentiveness measures the ability to listen attentively, notice cultural nuances and consider them during communication.

Each question is scored on a five-point scale ranging from low to high levels of the relevant competence, allowing for a comprehensive assessment of students' intercultural sensitivity. The online questionnaire was completed via Google Forms to anonymously collect students' responses. The testing was conducted twice: before the start of the experiment (pre-test) and after its completion (post-test) to assess the change.

2. Surveys

To assess students' motivation and their attitudes toward using the platforms, two questionnaires were used:

The Online Learning Motivation Questionnaire (15 items) with a 5-point Likert scale, which included items like "autonomy," "interest in learning," and "use of digital resources." The questionnaire was developed based on theoretical constructs of motivational psychology and adapted to the context of online language learning in higher education (Deci & Ryan, 2000; Hartnett et al., 2011).

The Platform Usability Survey (10 questions) assessed the interface, content accessibility, interactivity and overall satisfaction with the platform. This questionnaire was adapted from the System Usability Scale (SUS; Brooke, 1996) and modified for the context of evaluating the usability of online language learning platforms. The survey was conducted via Google Forms and through the built-in tools of the Duolingo, Flip and Padlet for a direct data collection while students were completing tasks.

3. Observation

Structured observation was conducted by the instructors (authors of the study) among students in the experimental group during their work with the online platforms. The observation focused on students' participation in chat rooms and forums (Zoom, Padlet), involvement in group projects (Flip), use of multimodal resources and evidence of autonomous learning. The observed activities were recorded using a structured observation scale from 1 to 5, where 1 indicated a low level of activity and 5 indicated a high level of activity. The observation data were quantified and included in the statistical analysis. As the observation protocol involved predefined quantitative indicators rather than open-ended responses, verbal quotations and thematic qualitative analysis were not used.

The observation procedure generated two types of evidence. First, predefined behavioural indicators were rated quantitatively on a 5-point scale and were used for the numerical assessment of students' activity. Second, the instructors recorded descriptive notes concerning students' communicative exchanges, peer interaction, intercultural comments and autonomous learning behaviours. These descriptive notes, together with students' Padlet posts and oral contributions from Flip and Zoom, constituted the qualitative dataset and were analysed thematically. Therefore, the numerical observation ratings were analysed quantitatively, whereas the descriptive observation notes and student-produced artefacts were analysed qualitatively.

4. Experiment

The experiment had a quasi-experimental design and included an experimental and a control group of 60 students each. The experimental group used Duolingo (grammar and listening), Padlet (writing exercises, group tasks), Flip (public oral presentations) and Zoom (synchronous discussions) for learning. The experiment consisted of 12 instructional sessions, 90 minutes each. Classes were held twice a week. Interactive exercises, project-based work and formative assessment were used. The control group was taught using traditional methods without the integration of digital platforms.

5. Analysis of academic performance.

The results of task completion on the platforms were evaluated by the instructors on a 5-point scale; average scores from tests and questionnaires were also collected. This allowed us to compared students' competency levels in the experimental and control groups.

The following statistical methods were used for data analysis:

1. Descriptive statistics—mean, median and standard deviation for group characteristics:

$$\bar{X} = \frac{\sum_{i=1}^{n} X_i}{n} \quad (1)$$

$$SD = \sqrt{\frac{\sum_{i=1}^{n} (X_i - \bar{X})}{n-1}} \quad (2)$$

2. Independent samples t-test – to compare the experimental and control groups:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{SD_1^2}{n_1} + \frac{SD_2^2}{n_2}}} \quad (3)$$

3. Paired groups t-test – to assess changes within groups:

$$t = \frac{\bar{D}}{SD_d/\sqrt{n}} \quad (4)$$

4. The Pearson correlation coefficient – to identify the relationship between activity on the platforms and the level of competence:

$$r = \frac{\sum(X_i - \overline{X})(Y_i - \overline{Y})}{\sqrt{\sum(X_i - \overline{X})^2 \cdot \sum(Y_i - \overline{Y})^2}} \quad (5)$$

5. Effect size (Cohen's d) – to assess the effect size of using online platforms on learning outcomes:

$$d = \frac{\overline{X_1 - X_2}}{SD_{poled}} \quad (6)$$

$$SD_{poled} = \sqrt{\frac{(n_1 - 1)SD_1^2 + (n_2 - 1)SD_2^2}{n_1 + n_2 - 2}} \quad (7)$$

SPSS software (v. 27) was used for statistical processing and analysis of the collected data.

3.4 Instruments

The study utilized digital platforms and mobile applications, which served as an experimental environment and facilitated the development and assessment of students' communicative and intercultural competence.

1. Duolingo

This is an interactive platform for learning foreign languages, which includes exercises in listening, reading, writing and grammar. The study utilized the B1–B2 English language modules for automatic assessment of task accuracy and learning speed. The platform also provided formative assessment through a system of points and levels, enabling the tracking of students' progress throughout the experiment.

2. Padlet

An online service for collaboration and content sharing. It was used for writing assignments and group projects, like intercultural topics, discussions of cultural realities and the creation of written presentations. The instructors could evaluate assignments based on criteria such as linguistic accuracy, depth of analysis and integration of cultural content.

3. Flip (formerly Flipgrid).

A mobile app for creating short videos and student presentations. It was used for oral speech, discussing intercultural situations and presentations on cultural aspects of foreign countries. Students received feedback from instructors and peers, which stimulated interactive engagement and the development of oral communication skills.

4. Zoom.

A real-time video conferencing platform used for online discussions, debates and group assignments. It was used to integrate student participation into the overall learning process and to assess their communicative skills in live interactions.

5. Google Forms.

Used to survey students, collect test data and assess their opinions on the platforms and motivation for online learning. The platform provided automated processing of responses and convenient generation of statistical reports.

All of the tools listed served as a pedagogical environment (Appendix 1) for the experiment that combined interactive tasks, formative assessment and online communication. The use of various platforms ensured a comprehensive approach to the development of students' communicative and intercultural competence by integrating technological capabilities into learning.

4. Results

The pre-test results, focusing on students' communicative and intercultural competence in the control and experimental groups, are presented in Table 1. The analysis of the mean values (M) and standard deviations (SD) indicates approximately the same initial level of competence in both groups. (Table 1).

Table 1. Indicators of communicative and intercultural competence of students in the control and experimental groups (pre-test)

Variable	Control group (n=60) M ± SD	Experimental group (n=60) M ± SD	t	P
Communicative competence	42.5 ± 5.3	43.1 ± 5.1	0.64	0.52
Intercultural competence	38.9 ± 4.7	39.3 ± 4.9	0.53	0.60

Note: n — number of participants in each group; independent samples t-test; α = 0,05.

Source: own elaboration

Particularly, the level of communicative competence in the control group was M = 42.5 (SD = 5.3), while in the experimental group, it was M = 43.1 (SD = 5.1). A similar trend was observed with intercultural competence. In the control group, the mean score was M = 38.9 (SD = 4.7), whereas in the experimental group, it was M = 39.3 (SD = 4.9). These results confirm the baseline equivalence of the control and experimental groups prior to treatment.

In addition, a detailed analysis of individual results showed that the majority of students in the experimental and control groups (approximately 65–70%) had an intermediate level of communicative competence, corresponding to CEFR B1 level. At the same time, only a small proportion of students (approximately 10–13%) demonstrated a high level of competence (B2), while 18–20% had a level below average. A similar pattern was observed for intercultural competence, where most students showed an average level of sensitivity to cultural differences, while high or low levels were less common. The results are presented in Figure 1.

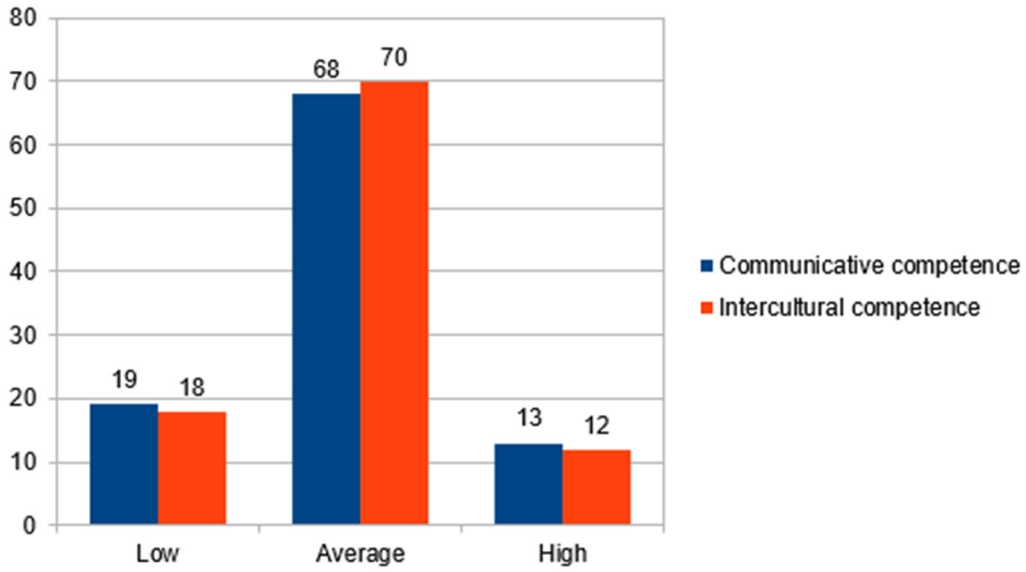


Figure 1. Distribution of students by their level of communicative and intercultural competence (pre-test)

Source: own elaboration

Note: numeric values in %

The data confirms that the sample is homogeneous in terms of key components of competences and also allows us to establish a baseline for comparing post-test results following the integration of online platforms. It is important to note that the absence of statistically significant differences at the beginning of the experiment ensures that subsequent changes in competency levels can be attributed to the impact of using digital platforms rather than to differences in students' initial knowledge.

The second stage of the experiment involved determining the level of students' communicative and intercultural competence after the integration of online platforms (post-test). The results in Table 2 reflect changes in the level of communicative and intercultural competence in the control and experimental groups throughout the experiment (from pre-test to post-test).

Table 2. Communicative and intercultural competence in the control and experimental groups from pre-test to post-test

Variable	Control group (n=60) M ± SD	Experimental group (n=60) M ± SD	t	P
Communicative competence	42.5 ± 5.3 → 45.1 ± 5.4	43.1 ± 5.1 → 52.8 ± 4.9	6.42	<0.001
Intercultural competence	38.9 ± 4.7 → 41.2 ± 4.9	39.3 ± 4.9 → 49.6 ± 4.8	6.88	<0.001

Note: n – number of participants in each group; independent samples t-test; p — p-value test; α = 0,05.

Source: own elaboration

The analysis of communicative competence presents a slight increase in the mean, from M = 42.5 (SD = 5.3) to M = 45.1 (SD = 5.4) in the control group. In contrast, the experimental group showed a significantly more positive dynamic: the score increased from M = 43.1 (SD = 5.1) to M = 52.8 (SD = 4.9). Similar trend is observed in intercultural competence. In the control group, its level increased moderately—from M = 38.9 (SD = 4.7) to M = 41.2 (SD = 4.9). At the same time, the experimental group showed a statistically significant increase, from M = 39.3 (SD = 4.9) to M = 49.6 (SD = 4.8).

To assess the relationship between students' activity on the platforms and their level of competence, the Pearson correlation coefficient was calculated. The results showed a moderate positive correlation between the number of tasks completed on Duolingo and an increase in communicative competence ($r = 0.46$, $p < 0.01$), as well as between activity on Padlet/Flip and an increase in intercultural competence ($r = 0.42$, $p < 0.01$). This indicates that intensive use of the platforms is associated with better outcomes in competence development. Additionally, Cohen's d was used to assess the effect size of the platform integration: for communicative competence, d = 1.15; for intercultural competence, d = 0.95, indicating a significant practical effect of using digital tools.

The next phase of the experiment was designed to comprehensively evaluate the effectiveness of the integrated use of online platforms (Duolingo, Padlet, Flip and Zoom) in the process of teaching English. The goal of this stage was to determine to what extent a fully digital environment contributes to the development of students' communicative and intercultural competence compared to traditional teaching methods.

Thus, all participants in the experimental and control groups completed the post-test assessment with the same tools as at the first stage: the English Language Test (CEFR B1-B2) and the Intercultural Sensitivity Scale (ISS). Student activity on the platforms was also assessed using internal statistics (number of completed exercises, posts, videos and participation in online discussions) of the platforms. The results are presented in Table 3.

Table 3. Post-test results comparison in the control and experimental groups

Variable	Control group M ± SD	Experimental group M ± SD	t	p	d
Communicative competence	3.27 ± 0.48	3.85 ± 0.40	6.45	<0.001	1.25
Intercultural competence	3.30 ± 0.50	3.76 ± 0.42	5.94	<0.001	1.05

Note: n = 60 in each group; independent samples t-test; p — p-value test; d — effect size coefficient (Cohen's d); α = 0,05.

Source: own elaboration

The results demonstrate that the overall level of communicative competence in the experimental group after the comprehensive use of the platforms was 3.85 ± 0.40, while in the control group it was 3.27 ± 0.48. The independent samples t-test showed a significant effect of the integrated use of the platforms, $t = 6.45$, $p < 0.001$.

Regarding intercultural competence, the average score post-treatment reached 3.76 ± 0.42 in the experimental group and 3.30 ± 0.50 in the control group; the increase was +0.71 in the experimental group and +0.22 in the control group ($t = 5.94$, $p < 0.001$). This confirms that a comprehensive digital environment effectively stimulates the development of intercultural skills compared to traditional teaching methods. Additionally, a comparative analysis of the effect size (Cohen's d) of the integrated approach was used:

- communicative competence: d = 1.25 – large-size effect;
- intercultural competence: d = 1.05 – large-size effect.

At the next stage, a survey was conducted in the experimental group to assess the pedagogical impact of integrating

online platforms into learning. The average satisfaction score for using the platforms was 4.42 ± 0.38 on a 5-point scale, indicating the high effectiveness of the digital environment for developing communicative and intercultural competence. Most students (over 85%) cited increased motivation, user-friendly interfaces and interactive tasks as main advantages of integrating platforms into learning.

Individual platform ranking showed that Duolingo received the highest rating (4.55 ± 0.35) for the effectiveness of grammar and listening development, Padlet received 4.47 ± 0.36 for intercultural and group tasks, Flip scored 4.38 ± 0.40 for the development of oral speech and presentations and Zoom got 4.30 ± 0.42 for interactive communication and group work. All differences between the platforms were statistically significant according to the paired groups t-test ($p < 0.05$).

The data confirm that students view the integration of online platforms into the foreign language teaching positively and the comprehensive use of digital tools contributes to increased motivation, engagement and the development of communicative and intercultural competence.

At the sixth stage, a comparative analysis of the final results of the experimental and control groups was conducted based on indicators of communicative and intercultural competence. The results are presented in Table 4.

Table 4. Comparison of communicative and intercultural competence in the control and experimental groups from pre-test to post-test

Variable	Pre-test	Post-test	Effect size Δ	Pre-test control	Post-test control	Effect size Δ
Communicative competence	3.12 ± 0.48	3.85 ± 0.40	+0.73	3.09 ± 0.51	3.27 ± 0.48	+0.18
Intercultural competence	3.05 ± 0.52	3.76 ± 0.42	+0.71	3.08 ± 0.50	3.30 ± 0.50	+0.22

Note: n = 60 in each group; Δ — effect size (post-test – pre-test); α = 0,05.

Source: own elaboration

The average level of communicative competence in the experimental group was 3.85 ± 0.40, while in the control group it was 3.27 ± 0.48, confirming the significant advantage of the digital educational environment. Intercultural competence reached 3.76 ± 0.42 in the experimental group and 3.30 ± 0.50 in the control group; the increase was also statistically significant ($t = 5.94$, $p < 0.001$). The changes from pre-test to post-test demonstrated a greater increase in competences in the experimental group compared to the control group, confirming the effectiveness of integrating online platforms as a learning tool. Cohen's d indicated a significant size effect: for communicative competence, $d = 1.25$; for intercultural competence, $d = 1.05$. The analysis of students' total activity across all platforms confirmed that higher engagement with Duolingo, Padlet, Flip and Zoom correlates with better post-test results. The findings indicate that the integrated use of digital platforms adds significant value to the learning process, ensures a higher level of student motivation and activity and contributes to the effective development of communicative and intercultural competence compared to traditional teaching methods.

Qualitative Findings

The qualitative analysis provided additional evidence concerning the ways in which students engaged with the digital learning activities. Four recurring themes were identified in the instructors' observation notes and students' learning artefacts: communicative engagement, peer interaction, intercultural reflection, and autonomous learning behaviour.

The first theme, communicative engagement, was reflected in students' increased willingness to initiate and maintain communication during Zoom discussions and Flip speaking activities. Rather than providing only short responses to teacher questions, students increasingly asked follow-up questions and expressed their own opinions. For example, one student explained: "At first I was afraid to speak because I thought I would make mistakes, but recording my answer on Flip gave me more confidence to express my ideas" (Student E17).

The second theme concerned peer interaction. Padlet and Flip activities created opportunities for students to respond to classmates' ideas, provide comments, and compare different answers. The observation notes indicated that students became more actively involved in collaborative tasks as the intervention progressed. One student described this experience as follows: "When I read my classmates' answers, I could see different ways of explaining the same idea, and this helped me improve my own answer" (Student E31).

The third theme was intercultural reflection. Students demonstrated a growing tendency to compare cultural practices instead of merely describing them. This was particularly evident in activities concerning national traditions, holidays, cities, and everyday cultural practices. One student noted: "I realized that we can celebrate the same holiday differently, and comparing these traditions helped me understand the cultural differences better" (Student E24).

The fourth theme, autonomous learning behaviour, was associated with students' independent preparation for digital

activities and their use of Duolingo and other online resources outside the scheduled sessions. Students increasingly reported preparing vocabulary and language material before participating in Padlet, Flip, and Zoom tasks. As one student stated: "I started practising vocabulary before the lesson because it was easier for me to participate in the discussion when I already knew the words" (Student E42).

Taken together, the qualitative findings indicate that the digital learning environment supported not only measurable gains in communicative and intercultural competence but also observable changes in students' participation patterns. The combination of synchronous interaction, collaborative digital tasks, and independent preparation appeared to encourage more active communication, peer-supported learning, intercultural comparison, and learner autonomy. These qualitative findings therefore provide contextual support for the statistically significant differences observed between the experimental and control groups.

4. Discussion

The findings of this study indicate that integrated online platforms are highly effective in developing students' communicative and intercultural competencies in higher education. This is evidenced by positive changes in both average competency scores and students' perceptions of the effectiveness of digital tools. These results align with the findings of Yulia et al. (2019), who observed that interactive platforms integrate assessment and learning in real time, increasing student motivation and effectiveness of formative assessment.

The results demonstrate that the active use of the Duolingo, Padlet, Flip, and Zoom platforms improves not only communicative skills but also intercultural sensitivity. This finding confirms the observations of Habib et al. (2021), who noted that interactive digital platforms transform the university environment by ensuring sustained and effective student engagement in the learning process.

Our data also aligns with the findings of Gao and Zhang (2020) and Choi and Chung (2021), who emphasized the importance of adapting to online environment and utilizing technology to support the learning process under unstable conditions for foreign language teachers. The intensity of students' engagement with the platforms was found to correlate directly with increased competences, indicating the significance of regular activity and interactive tasks for lasting skills development.

The use of flipped learning and interactive tools, as observed in Abdelshaheed's (2017) study, confirms the effectiveness of this approach, in which students complete assignments on online platforms prior to in-class sessions, thus, fostering greater engagement in the learning process and the development of independent learning skills. Similar findings were observed in a study by Tarrayo and Anudin (2023), where flexible online environments allowed instructors to develop materials and adapt assignments to meet students' individual needs.

The most notable finding of our study is the confirmation that digital platforms enable formative assessment and real-time feedback, which aligns with the results of Muñoz-Alcón et al. (2023). Students received instant feedback on their responses, which stimulated the development of communication skills and increased their confidence in using English. Similar findings on student and teacher perspective are also reflected in Rojabi's (2020) work, where students noted the convenience of the online environment and the possibility of effective self-directed learning via Microsoft Teams.

At the same time, our results do not fully align with a number of studies, where the effectiveness of digital platforms for the development of communicative and intercultural competencies is assessed more cautiously. In particular, Wang and Curran (2025) note that the process of platformization in online language teaching can lead to the fragmentation of learning experience, shifting focus on formal indicators of activity rather than on in-depth competence development. Unlike our study, the authors highlight the risk of decline in the quality of communicative interaction, when commercially oriented platforms dominate the learning process without clearly defined pedagogical goals.

Partially different results are also observed in the study by Gao and Zhang (2020), which emphasizes that the use of online environments alone does not guarantee the development of communicative competence without pre-established methodology. In some cases, the authors note the superficiality of student interaction, which limits opportunities for intercultural understanding of communication. Similar concerns are expressed by Choi and Chung (2021), emphasizing that excessive technologizing of learning can reduce the depth of reflection and interpersonal dialogue.

In our view, the discrepancies between these findings and the data from our study are due to differences in methodological approach. In 10 previous studies, digital platforms are viewed as self-contained learning tools, whereas in our study, they functioned as a holistic pedagogical environment integrated into the course structure with clearly defined communicative and intercultural goals.

5. Limitations of the Study

One limitation of the study is the sample, which included students from certain faculties and majors, which may limit the generalizability of the results to all higher education institutions. Additionally, the study was limited to the use of a specific set of online platforms (Duolingo, Padlet, Flip, Zoom), so the results may differ when using other digital tools or their combination. The duration of the experimental period could also have influenced the depth of competence development, as longer-term use of the platforms might have yielded different outcomes. Finally, the assessment of competences was partially based on students' independent work and surveys, which could include a subjective perspective, although this was partially countered by the use of standardized tests and scales.

6. Conclusions

The study confirmed that the integration of online platforms (Duolingo, Padlet, Flip and Zoom) into the English language teaching process in higher education institutions effectively contributes to the development of students' communicative and intercultural competence. The experimental group demonstrated significantly higher results compared to the control group: the average level of communicative competence post-treatment was 3.85 ± 0.40 versus 3.27 ± 0.48 in the control group, and 3.76 ± 0.42 versus 3.30 ± 0.50 for intercultural competence. The increase in competences in the experimental group exceeded 0.70 points for both variables and was statistically significant ($t = 6.45$, $p < 0.001$ for communicative competence; $t = 5.94$, $p < 0.001$ for intercultural competence). Student activity on the platforms correlated with better post-test results, while formative feedback and interactive tasks boosted motivation, autonomy and engagement in the learning process. The study results confirm that the comprehensive use of the digital environment ensures a steady increase in students' competences and can serve as a methodological basis for developing adapted curricula. Implications for future research include expanding the student sample to include various faculties and universities to enhance the generalizability of the results as well as incorporating new online platforms and mobile applications to compare their effectiveness in developing communicative and intercultural competence. Conducting long-term studies is advisable for assessment of lasting results and the impact of consistent use of digital tools on students' level of autonomy, motivation and academic success.

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Author contributions

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Appendix A

Session structure for the experimental group

Session	Topic	Activity	Platform	Aim / competence
1	Course and student introduction	Icebreaker, students' introduction	Zoom	Development of communicative competence, creating of pleasant learning atmosphere
2	Grammar: Present Simple	Interactive tasks	Duolingo	Grammar skills, autonomous work
3	Listening: daily communication	Listening and discussion	Duolingo	Listening comprehension
4	Writing: personal letter	Group writing activities	Padlet	Written communication, intercultural communication
5	Project: my city	Presentation planning and preparing	Padlet	Development of intercultural competence through cross-cultural comparison
6	Oral presentation about the city	Public oral speaking	Flip	Communicative competence, presentation skills
7	Discussion: traditions and holidays	Synchronous discussion	Zoom	Speaking, intercultural sensitivity
8	Grammar: Past Simple	Interactive tasks	Duolingo	Grammar knowledge
9	Listening and Speaking: traveling	Role playing	Duolingo / Zoom	Speaking, modeling of real-life situations
10	Writing: event description	Group tasks	Padlet	Written communication, reflection on intercultural experience
11	Project: country's culture	Presentation preparation	Padlet / Flip	Intercultural competence, team work skills
12	Public presentation about a country	Presentation and Discussion	Flip / Zoom	Synthesis of knowledge, development of communicate competence