

Multimodal Approach to Teaching English as a Factor in Improving Engineering Students' Research Skills

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Abstract—In the context of the internationalisation of higher education and the growing role of English as a global language of science and technology, the development of both communicative and research skills among engineering students has become increasingly important. This study investigates the effectiveness of a multimodal approach to teaching English as a factor in improving engineering students' research skills. A quasi-experimental design was employed involving 90 undergraduate students of automotive engineering at Kharkiv National Automobile and Highway University (Ukraine). The experimental group participated in a multimodal English course integrating audiovisual translation, digital learning resources, English for Specific Purposes, and extracurricular research activities, while the control group received traditional language instruction. The effectiveness of the intervention was evaluated using three indicators: information search and analysis skills, English communicative competence, and research self-efficacy. Statistical analysis using Pearson's chi-square test demonstrated significant improvements in the experimental group compared to the control group. The results indicate that the multimodal approach significantly enhances students' information literacy, communicative competence, and confidence in conducting research. The findings highlight the potential of multimodal language instruction to support the development of academic and research competencies among engineering students.

Keywords – *engineering students, foreign language teaching, multimodal approach, research skills.*

INTRODUCTION

In recent decades, researchers aiming to share their findings with the global scientific community have increasingly written and published their articles in English. English has emerged as the lingua franca, providing access to research conducted by scientists worldwide. One indication of English's dominance in the fields of science and technology is that over 90% of indexed scientific articles in the natural sciences have been published in this language [1].

The role of English is increasingly significant due to the internationalisation of higher education. There has been a notable rise in cross-border migration by international students pursuing studies at educational institutions outside their home countries [2]. Host universities are not only in Anglophone countries with native English-speaking populations, but also in many other countries, such as Austria, Denmark, the Netherlands, Greece, Italy, and Spain, that offer their training programs in English [3].

Besides knowledge of so-called General English, which is necessary for survival in the host country, all students entering higher education institutions need to have skills in using academic English to be able to study a variety of subjects, and English for Specific Purposes (ESP) to understand and produce oral and written texts

Online ISSN 3044-7771

<https://doi.org/10.68302/std2026.vol3.19>

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typical of the specialised subject area they are going to master.

Thus, the relevance of studying English in all its diversity is beyond doubt. Traditionally, students in a foreign language (FL) course master four skills: listening, reading, speaking and writing, mainly based on textbooks created by such respectable publishers as Oxford University Press, Cambridge University Press, Pearson Macmillan Learning, Routledge Taylor & Francis Group, Wiley Publishers, etc. However, modern students live in a world filled with images and sounds mixed with texts, a multimodal world to which they need to adapt and which makes its own adjustments to the approaches to learning a FL.

Multimodality involves using two or more modes of communication to convey the text in the broad sense of this meaning. There are five modes that people use when communicating: 1) linguistic, which focuses on the use of written or spoken language; 2) visual, which prioritises visual images such as symbols, signs, visual design, colour, font type and size; 3) auditory, which focuses on voice, music, sound effects, background noise; 4) gestural, which is realised through facial expressions, hand gestures and body language; and 5) spatial, which involves the physical arrangement of objects.

In modern multimedia resources, communication is realised through images, spoken language, music, and often written texts in the form of subtitles. Such multimodality requires a rethinking of existing approaches to teaching communication, allowing students to read multimodal texts (viewing) and to generate and transmit them (representing) independently. This new type of literacy is vital for the current generation, as it aligns with their way of life and the peculiarities of their interactions with others [4].

Teaching FL, unlike any other activity, requires the broadest range of didactic methods and multimedia tools, as modern research shows [5]. Learning a language with the help of digital technologies can be no less effective than face-to-face training if it is based on a proven, reliable language-teaching methodology that takes into account modern advances in research on the mechanisms of language acquisition and provides a systematic approach to designing the learning process in the context of digitalisation.

The globalised world in which we live, as well as growing academic and scientific mobility, have led to multilingual societies in which linguistic exchanges between native and non-native speakers have become a common practice and reinforce the importance of not only linguistic but also pragmatic competence, which means the ability to convey and perceive the intended message with all its nuances in any socio-cultural context [6]. Modern technologies allow students to go beyond using language only in the classroom and immerse them in real-life out-of-class contexts where they can develop their pragmatic skills in using a FL across a wide range of situations.

Since much modern communication occurs digitally, technology-mediated assignments allow students to engage in socio-pragmatic practice on virtual communication platforms such as email, chat or instant messaging, online forums, and social media. Scholars call this cyberpragmatics, which evaluates situations in terms of what works best or how it can be improved [7].

Currently, linguodidactics is witnessing the increasing popularity of audiovisual translation (AVT) as a new approach to teaching languages and cultures, defined as the transmission of verbal language through audiovisual means and also termed screen, multimedia, or multimodal translation.

Today, audiovisual materials are a key resource in language teaching, providing learners with linguistically and culturally rich, digitally enhanced content that is close to the real world [8].

Khazdouzian et al. [9] studied the impact of audiovisual material on pragmatic language learning and the formation of pragmalinguistic competence, revealing their positive effect. However, as the authors note, although ATV is relevant to FL teaching, only a few studies have explored the relationship between audiovisual resources and pragmatics in language use.

Traditional approaches to teaching FL, which are aimed at increasing students' language proficiency level close to that of native speakers, are losing their relevance, as they no longer prepare students for communication in a world where a third of the planet's population are representatives of different countries and cultures [10].

Students are now expected to be prepared for intercultural communication, which implies that they must be both pragmatically and interculturally competent. Based on this idea, approaches are being developed to ensure students' metapragmatic awareness and strategies for dealing with the hybrid nature of English, its different varieties and the wide range of cultures associated with it [11].

Sal y Rosas Flores [12] highlights the vital importance of encouraging the practical application of research knowledge. This approach not only improves academic performance at the university but also fosters teamwork skills, strengthens interpersonal relationships, and enhances mutual support.

Salazar Peralta et al. [13] emphasise that enhancing research competencies requires the targeted development of students' curiosity and willingness to embrace new ideas, as these qualities form the foundation of their intellectual growth.

Thus, the challenge for technical universities is to find effective ways to combine traditional and digital multimodal methods to prepare prospective engineering professionals for future activities in an English-speaking multicultural environment.

The aim of this study was: 1) to demonstrate the importance of a multimodal approach in enhancing the English language communicative competence of engineering students along with their research skills; and

2) to evaluate the impact of a multimodal English language course, as well as students' participation in extracurricular scientific activities, on their research skills and language proficiency.

To achieve the research aim, the study addresses the following research questions:

RQ1. Does the implementation of a multimodal approach in teaching English improve engineering students' information search and analysis skills compared to traditional instruction?

RQ2. Does participation in a multimodal English course significantly influence students' English communicative competence?

RQ3. Does the multimodal approach combined with participation in extracurricular scientific activities enhance students' research self-efficacy?

RQ4. Are the differences between the experimental and control groups statistically significant according to Pearson's chi-square test?

MATERIALS AND METHODS

Research Design

This study employed a quasi-experimental design involving an experimental and a control group to evaluate the effectiveness of the multimodal approach in teaching English and developing research skills. An experiment was conducted at Kharkiv National Automobile and Highway University (KhNAHU). The following tasks were undertaken during the study: preparing training materials for the experimental work; determining criteria and indicators for assessing students' achievements; forming groups for experimental training; evaluating the initial levels of students' linguistic and research competencies at the pre-experimental stage; conducting the experimental training to test the effectiveness of the approach; assessing the levels of students' linguistic and research competencies at the post-experimental stage; and processing and analysing the experimental data.

Participants

An experimental group (EG) consisting of 46 junior students majoring in automotive engineering was formed to study English using a variety of multimodal methods. In contrast, a control group (CG) of 44 students was instructed using traditional training methods. Both groups attended 90-minute classes once a week during the 2024-2025 academic year.

The study was conducted in accordance with ethical research standards. Participation was voluntary and anonymous. No personally identifiable information was collected, and all data were analysed in an aggregated and anonymised form.

Instructional Intervention

Since motivation is the foundation of any educational activity, one of the primary responsibilities of a foreign language teacher is to create conditions that encourage students to learn the language both in and out of the classroom.

Motivation to learn a foreign language can take various forms: instrumental, expressive, sociocultural, academic [14].

To increase students' interest in language learning and research, we used various examples demonstrating the practical value of language skills for future professional careers. During interviews, students were shown that modern companies prefer specialists who speak several languages, as international projects require effective communication. In engineering, a significant portion of work is conducted in international teams whose members represent different cultures and utilise a variety of digital communication tools, including email, social media, and online video conferencing platforms [15]. Being prepared for this type of interaction directly impacts professional success.

The use of internet technologies in teaching has proven effective in increasing motivation and developing language skills. The internet provides access to a variety of resources: videos, audio recordings, interactive exercises, e-books, articles, and educational platforms. Furthermore, online services allow students to complete assignments and receive quick feedback.

In our experiment, English language instruction was based on a multimodal approach and encompassed three areas: developing general language skills, acquiring English for Specific Purposes (ESP), and developing intercultural competence. The primary teaching method was a communicative approach focused on the practical use of language in real-world situations. Elements of a constructivist approach were also employed, in which students actively build knowledge through personal experience, independent information-seeking, and interaction with the environment.

In the EG, general English instruction was conducted using the Empower textbook [16], available in both print and electronic versions. The educational material was supplemented by original developments by the department's teachers, created using audiovisual technologies.

We adapted audiovisual translation elements using the parallel translation method. Vocabulary was presented simultaneously in written and audio form and posted on YouTube [17]. During deliberate pauses in the recordings, students could repeat language fragments as many times as necessary, which facilitated speech automation and improved pronunciation. In the classroom, the material was reinforced through creative tasks and problem-solving exercises.

This approach is an example of multimodal learning, as it combines several modes of information transmission: linguistic (oral and written speech), visual (images, symbols, design, fonts), and auditory (voice and sound). Additionally, the videos we created were supplemented by internet videos, which introduced two more modes – gestural and spatial.

Such an integrated approach allowed students to independently work with a wide range of materials

covering grammar and cultural content. The video resources covered history, politics, economics, literature, art, cinema, music, and traditions, which contributed to developing readiness for effective intercultural communication.

The ESP competence of automotive engineering students was developed through a course designed in collaboration with instructors in automotive disciplines and made available on the Moodle platform [18] and in traditional paper format [19]. The Moodle course consisted of several thematic modules related to modern automotive engineering, including internal combustion engines, electric and hybrid vehicles, intelligent transport systems, automotive electronics, environmental sustainability, and autonomous driving technologies. Each module integrated multimodal learning resources such as technical texts, glossaries, video lectures, presentations, discussion forums, quizzes, communicative tasks, and self-study assignments. The platform also enabled asynchronous interaction, peer discussion, online assessment, and access to supplementary professional materials, thereby supporting students' independent learning and research activities.

The research skills of prospective professionals were developed both in the classroom and through independent work.

To prepare students for future manufacturing challenges, various methods were employed, including writing an abstract for a research article related to students' future professional activities, preparing an oral presentation on students' coursework in English, examining a professional case study, participating in English-language forums, the simulation of professional situations, business games, and research activities related to the development of new technologies and the forecasting of innovation consequences. Students also engaged in problem-solving scenarios and moral dilemmas, particularly those concerning self-driving cars. For example, should a driverless car sacrifice its passengers to save pedestrians' lives? What should it do if a cyclist suddenly enters its lane – should it swerve into oncoming traffic or collide with the cyclist? Should a robotic car protect its occupants during an accident but endanger a pedestrian crossing the road?

Additionally, the method of presentation, as a specific form of business communication, was widely used in ESP instruction for engineering students. This approach helped students structure their information, persuade potential partners and clients, and develop their rhetorical skills. In preparation for classes, students were required to independently search for relevant information on the course topics, which they then organised into presentations followed by group discussions.

The topics of students' presentations included: "Development of New Fuel Sources for Electrification of Automotive Transport," "Advantages and Disadvantages of Hydrogen Fuel Cells," "Development of Solid-State Batteries," "Fundamental Changes in Business Models of

Automotive Transport," "Improving Charging Infrastructure for Electric Vehicles," "Modern Approaches to Increasing Energy Efficiency in Vehicles," "Next-Generation Batteries," "Solutions to Autonomous Driving Challenges," and "Predictions for the Automotive Industry in Ten Years" and others.

The features of the students' reports and presentations included the productive nature of their speech, independence in selecting content and linguistic means, and a logical structure.

Training materials for developing intercultural competence included the specially designed textbook "Theory and Practice of Cross-Cultural Communication" [20], offered to students in both printed and electronic formats.

A modern textbook is a classic example of a multimodal text, combining several modes of information transmission: written language, images (illustrations, graphs, tables), page layout, typography, and, in digital formats, audio or video. It is important to teach students to understand how these different modes interact to create a communicative act [21].

The textbook we developed is based on a sociocultural approach that views multimodality as part of social practices and cultural contexts. It emphasises how different modes interact and are used together to enhance the meaning of the message in specific social situations [22].

This textbook, drawing on the authors' accumulated theoretical material and practical experience, aims to provide a generalised understanding of a model for teaching intercultural communication in English that future professionals can use to establish intercultural contacts.

The textbook consists of theoretical and practical parts. The theoretical part introduces students to the specific features of intercultural communication, while the second part familiarises them with the characteristics of cultures typical of different regions of the world.

The course material covers a wide range of topics typical of intercultural communication, including types of communication, examples of intercultural differences, ways to improve intercultural communication, specifics of business negotiations, conflict resolution in a multicultural environment, and the concept of ethnicity in the context of intercultural relations. The textbook contains numerous tasks of a reproductive, discussion, and creative nature. Its second part is devoted to comparing the cultures of different countries, solving problematic situations, and completing a case study.

The authors aimed to ensure that the diverse content of the course and the proposed activities would significantly contribute to students' development of intercultural competence and their readiness to connect with representatives of other cultures.

For example, when working with the topic "A guide to international business negotiations", students are offered different tasks at various levels and problematic issues, for

example, a question for consideration: Your company is going to conclude its first export contract. What could be done to secure this contract and establish long-term relationships with your prospective partners?

In the second part of the textbook for comparing different cultures, the following tasks can be solved:

a) Write a portrait of a typical/average Englishman, Australian, Spaniard, Arab, etc. Then comment on their similar features and cultural differences.

b) Write a list of DOs and DON'Ts for a friend of yours who is going as a tourist to China, the United Arab Emirates, etc.

In addition to the text material, each topic of the textbook was accompanied by a video of either a general cultural nature (for example, countries and continents, 7 wonders of the world, the best museums in the world, etc.), or touching on aspects of intercultural interaction relevant to the topic), for which tasks were developed to understand the content of the video and discuss it.

Besides, the Department of Foreign Languages organised regular competitions for student research papers in foreign languages on various topical cultural and socio-humanitarian themes. Some of the themes included: "What Inventions Await Us in the Future?", "Global Challenges of the 21st Century," "Multicultural Communities: How Do They Coexist?", "Volunteering as a Socio-Cultural Phenomenon in Modern Society," "Modern Education: The Biggest Threats and Challenges," and "What Are the Potential Benefits and Dangers of Artificial Intelligence?"

At KhNAHU, like in many other higher education institutions, there is a tradition of holding annual student scientific conferences. In the experimental year, the topics covered numerous technical, economic, cross-cultural and social aspects, showcasing a wide range of student interests in automotive engineering as well as humanitarian problems. Among others, they focused on the prospects of using artificial intelligence in the automotive industry, environmental issues related to transportation, and the challenges of post-war restoration of Ukraine's transport industry.

In preparation for their presentations, students needed to study substantial material on their chosen subjects, master multimedia presentation techniques, develop rhetorical skills, and learn to conduct debates.

RESULTS AND DISCUSSION

The following criteria were established to assess students' communication skills and their abilities in research activities: 1) the cultivation of information search and analysis skills; 2) the development of English communication competencies; and 3) the enhancement of research self-efficacy.

Development of Information Search and Analysis Skills

The first research question concerned the development of students' information search and analysis skills. These skills were evaluated based on the ability to locate,

evaluate, and use scientific information obtained from digital sources.

Information search and analysis skills are an important element of a professional competence in the information society, as they help actively leverage the capabilities of computer networks to facilitate a fruitful exchange of information. We believe that a prospective engineering professional should know the methods of information search and analysis, be able to find, differentiate and process information, use modern means of communication, and receive and exchange information about the development of their field through personal contacts, membership in a particular scientific community, work on the internet, participation in real and web conferences, etc.

Information search and analysis skills may be considered sufficiently developed if students master the methods and culture of working with information obtained on the internet, show interest in search activities, and strive to analyse scientific and reference sources. The skills are not sufficiently developed if students are indifferent to seeking new information; they lack the skills to work with scientific and reference sources and modern communication tools.

We used the ACRL framework [23] aligned with the purpose of our study to assess the ratio of students in the EG and CG participating in research activities, including student competitions, conferences, roundtable discussions, and publications in scientific journals.

An analysis of the dynamics of information search and analysis skills revealed a significant positive trend in the EG compared to the CG (see Table I).

TABLE I TRENDS IN THE DEVELOPMENT OF INFORMATION SEARCH AND ANALYSIS SKILLS

Criteria and indicators	EG (n = 46)		CG (n = 44)	
	Pre-test	Post-test	Pre-test	Post-test
1	2	3	4	5
Information search and analysis skills:				
Developed information search and analysis skills	31.3	82.4	32.1	59.4
Insufficient motivation and poor information skills	68.7	17.6	67.9	40.6

Note. Values represent percentages of respondents. EG = experimental group; CG = control group.

Pearson's χ^2 test revealed statistically significant differences in the development of information search and analysis skills among students in the EG before and after the formative stage of the experiment ($\chi^2 = 22.44$; $p <$

0.001). Changes were also recorded in the CG, but they were less pronounced ($\chi^2 = 5.55$; $p < 0.05$). These data confirm the effectiveness of the developed teaching method.

Development of English Communicative Competence

The second research question examined the effect of the multimodal course on students' English communicative competence.

To assess communicative competence, a language test was developed, including tasks in general English and ESP. The test consisted of 100 items of various types: multiple-choice, matching, true/false, fill-in-the-blank, and listening, speaking, and creative writing. The assessment was based on quantitative indicators using Bepalko's methodology [24], which involves determining the levels of material acquisition: recognition, reconstruction, productivity, and creativity. This approach allows for an objective assessment of the degree of comprehension and memorisation of the material, its level of complexity, and the degree of automation of acquired skills.

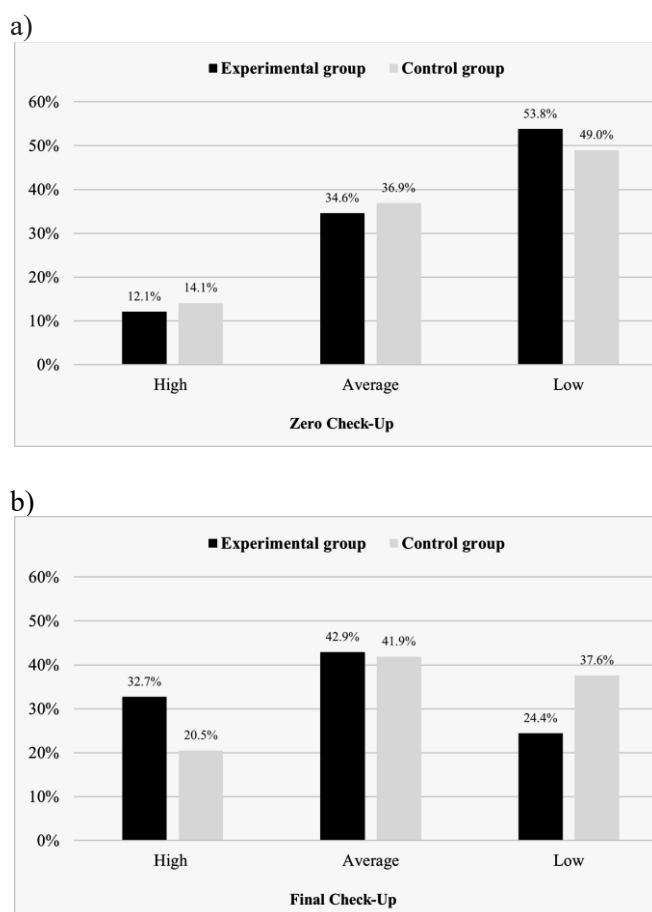


Fig. 1. Trends in the Development of English Communication Competence Levels (%)

After completing the test, the number of correct answers was counted to determine the student's language proficiency level. A score of over 80% was considered high, 60% to 80% – intermediate, and less than 60% – low. The distribution of students by English proficiency level is shown in Fig. 1.

Statistical analysis confirmed the significance of these changes. Pearson's chi-square test showed statistically significant differences between the pre-test and post-test results in the EG ($\chi^2 = 8.4$, $p < 0.05$). In contrast, the changes observed in the CG did not reach statistical significance ($p > 0.05$).

These results suggest that the integration of multimodal learning resources, audiovisual materials, and communicative tasks contributed to a measurable improvement in students' English communicative competence.

Development of Research Self-Efficacy

The third research question focused on the development of students' research self-efficacy, defined as students' confidence in their ability to perform key stages of the research process.

To assess research self-efficacy, an adapted version of the Research Self-Efficacy Scale, initially developed by Holden et al. [25], was used. This instrument measures students' confidence in completing the main stages of research: problem formulation, literature review, methodology selection, data processing, and writing a scientific paper.

The scale was adapted to meet the objectives of the current study with an emphasis on key components of students' research competence. The wording of all items was revised to reflect Bandura's self-efficacy theory. Ratings were conducted on a five-point Likert scale, ranging from 1 ("not at all confident") to 5 ("very confident") (see Table II).

The construct validity of the instrument is supported by the theoretical consistency of all items, which are designed to measure a single latent construct – research self-efficacy. The scale's unidimensional structure is consistent with previous research in this area.

At the end of the experimental year, after gaining experience through research activities, students completed a self-assessment scale. A comparative analysis of the results of the experimental and control groups revealed apparent quantitative differences in the level of development of research competencies. According to descriptive statistics, the average score in the EG was 4.44 on a five-point scale, while in the CG it was 2.78. This difference of 1.66 points indicates a higher level of skill development among students in the EG.

The EG demonstrated consistent positive dynamics in virtually all research skills. The most significant differences ($\Delta M = 2-3$ points) were observed in higher-level skills: interpreting results, formulating conclusions based on data, justifying methodology, and written and

oral scientific communication. This indicates the development of complex analytical and reflective skills.

Moderate differences ($\Delta M = 1-2$ points) were found in procedural skills: formulating research problems, selecting methods, planning the study, and conducting quantitative and qualitative data analysis. The stability of these differences across several indicators suggests a systemic training effect.

TABLE II ADAPTED RESEARCH SELF-EFFICACY SCALE

Item No.	Item statement	Scale
1.	I am confident in my ability to formulate a relevant scientific research problem.	1-5
2.	I am confident in my ability to clearly define the purpose and objectives of the research.	1-5
3.	I am confident in my ability to find relevant scientific sources on the research topic.	1-5
4.	I am confident in my ability to critically evaluate scientific literature.	1-5
5.	I am confident in my ability to formulate research questions or hypotheses.	1-5
6.	I am confident in my ability to select appropriate research methods in accordance with the research purpose.	1-5
7.	I am confident in my ability to develop a coherent research design.	1-5
8.	I am confident in my ability to justify the choice of research methodology.	1-5
9.	I am confident in my ability to collect empirical data in an appropriate manner.	1-5
10.	I am confident in my ability to use quantitative data analysis methods.	1-5
11.	I am confident in my ability to use qualitative data analysis methods.	1-5
12.	I am confident in my ability to interpret obtained research results.	1-5
13.	I am confident in my ability to draw justified conclusions based on empirical data.	1-5
14.	I am confident in my ability to discuss research results in a scientific context.	1-5
15.	I am confident in my ability to formulate research results in written form.	1-5
16.	I am confident in my ability to use an appropriate scientific writing style.	1-5
17.	I am confident in my ability to present research results orally (e.g., presentations or reports).	1-5
18.	I am confident in my ability to independently complete a research project.	1-5

The CG demonstrated lower mean scores and less variability, reflecting a predominantly moderate level of research competence.

Thus, the collected data were analysed using descriptive statistics and Pearson's chi-square (χ^2) test to determine whether the observed differences between

groups and experimental stages were statistically significant. A significance level of $p < 0.05$ was adopted to determine statistical significance.

Overall, the EG demonstrated more pronounced and systematic improvements in information search and analysis, language proficiency, and research skills. Differences in the final distribution of results indicate a more substantial developmental effect of the applied method, particularly in increasing motivation to work with sources, confidence in public speaking, and the effective use of research materials.

The study also found that students prefer searching online because it provides quick access to a wide range of resources, including scientific articles and lectures from leading universities. The online environment offers a range of convenient learning formats: reading, watching video lectures, listening to podcasts, or participating in interactive courses. Furthermore, digital resources are updated more quickly than print publications, enabling self-paced learning.

However, searching for information online also has its drawbacks: information overload, issues with source reliability, dependence on technical specifications, intrusive advertising, and privacy risks. Printed publications, on the other hand, offer more structured, curated material, though they lag the internet in terms of update speed and searchability.

Experience in teaching ESP has shown that students are not always sufficiently engaged, despite the course's direct relevance to their future profession. To enhance interest, it is important to connect the learning material with real-world professional tasks. This can be achieved through practical assignments involving information search and analysis, presentation preparation, role-playing, simulated work situations, and gamification elements. The use of professionally oriented articles, videos, and case studies makes learning more meaningful and practical.

Increasing students' confidence in independent research in English requires a comprehensive approach that includes practical assignments, motivational strategies, the use of digital technologies, and the development of communication skills. The use of authentic materials related to the future profession plays an important role, as does the development of self-management skills such as goal setting, time management, and working with information resources.

The audiovisual method used in the study has both advantages and limitations. Its strengths include improved listening and visual comprehension, automated speech skills, and increased learning intensity. However, excessive focus on limited language material can reduce the depth of learning and the development of analytical thinking. Rapid acquisition of speech patterns ensures functional competence, but does not always guarantee full language proficiency. Despite certain limitations, this digital method appears promising and requires further research and improvement.

The textbook "Theory and Practice of Cross-Cultural Communication" demonstrates the effectiveness of sociocultural and multimodal approaches to developing intercultural communicative competence. Of particular value is the assignments' focus on simulating real-life professional situations (e.g., international negotiations), which enhances the practical nature of the training. At the same time, a discussion of the results calls for further empirical confirmation of the long-term impact of multimodal resources on the sustainability of acquired intercultural skills and their transfer to real-world professional contexts.

CONCLUSIONS

Key components of professional competence for future engineers include developed communication skills, intercultural competence, the ability to work effectively in international teams, and proficiency in English as a professional language.

Technical universities play an important role in preparing specialists for scientific and technical work in a globalised world. This training requires special attention to the study of foreign languages and the development of research competencies that ensure graduates' international competitiveness.

Modern communication is multimodal and encompasses linguistic, visual, auditory, gestural, and spatial modes of information transfer. This is evident in the widespread use of videos, blogs, presentations, web resources, and other digital formats. Therefore, students must be prepared not only to perceive but also to produce multimodal texts in accordance with the demands of the modern professional environment.

The digital space offers extensive access to English-language professional development resources. These resources foster students' cognitive and research interests and can be used in formal education, through independent work and informal learning. Informal learning includes participation in scientific competitions, conferences, and roundtables, as well as the preparation of publications.

To effectively develop future engineers' communicative competence and research skills, it is necessary to design and implement innovative multimodal courses. Such courses develop modern academic and digital literacy and prepare students for professional work in the dynamically evolving digital space.

REFERENCES

- [1] R. E. Hamel, "El campo de las ciencias y la educación superior entre el monopolio del inglés y el plurilingüismo: Elementos para una política del lenguaje en América Latina," *Trab. Linguist. Apl.*, vol. 52, pp. 321–384, 2013. <https://doi.org/10.1590/S0103-18132013000200008>
- [2] A. Perez-Encinas and J. Rodriguez-Pomeda, "Geographies and cultures of international student experiences in higher education," *J. Int. Stud.*, vol. 9, no. 2, pp. 412–433, 2019. <https://doi.org/10.32674/jis.v9i2.271>
- [3] Z. Köylü and N. Tracy-Ventura, "Learning English in today's global world: A comparative study of at home, anglophone, and lingua franca study abroad," *Stud. Second Lang. Acquis.*, vol. 44, pp. 1330–1355, 2022. <https://doi.org/10.1017/S0272263121000917>
- [4] K. Donaghy, S. Karastathi, and N. Peachey, *Multimodality in ELT: Communication Skills for Today's Generation*. Oxford, U.K.: Oxford Univ. Press, 2020.
- [5] S. Zeng, "The potential of online technology for language learning," *English Lang. Teach.*, vol. 13, no. 10, pp. 23–37, 2020. <https://doi.org/10.5539/elt.v13n10p23>
- [6] A. Sánchez-Hernández and J. Barón, "Teaching second language pragmatics in the current era of globalization: An introduction," *Lang. Teach. Res.*, vol. 26, no. 2, pp. 163–170, 2022. <https://doi.org/10.1177/13621688211064931>
- [7] M. González-Lloret, "Technology-mediated tasks for the development of L2 pragmatics," *Lang. Teach. Res.*, vol. 26, no. 2, pp. 173–189, 2022. <https://doi.org/10.1177/13621688211064930>
- [8] N. Talaván, A. Fernández-Costales, and J. Lertola, *Didactic Audiovisual Translation and Foreign Language Education*. New York, NY, USA: Routledge, 2024.
- [9] Y. Khazdouzian, J. Barón, and M. L. Celaya, "When watching is not enough: The effects of captions on L2 pragmatics acquisition and awareness," *RAEL: Rev. Electrón. Lingüíst. Apl.*, vol. 19, pp. 90–107, 2021.
- [10] D. Crystal, "Two thousand million? Updates on the statistics of English," *English Today*, vol. 24, no. 1, pp. 3–6, 2008. <https://doi.org/10.1017/S0266078408000023>
- [11] Z. Tajedin and M. Alemi, Eds., *Pragmatics Pedagogy in English as an International Language*. London, U.K.: Taylor & Francis, 2021, pp. 1–18. <https://doi.org/10.4324/9781003097303-1>
- [12] R. R. Sal Y Rosas Flores, "Factors of learning strategies contributing to students' research skills," *J. Inf. Syst. Eng. Manag.*, vol. 10, no. 19s, pp. 825–833, 2025. <https://doi.org/10.52783/jisem.v10i19s.3119>
- [13] J. Salazar Peralta, J. Meléndez Cruz, and M. Cardenas Rivera, "Students' research skills: A systematic review article," *Rev. Invecom*, vol. 6, no. 1, pp. 1–11, 2026. <https://doi.org/10.5281/zenodo.15866881>
- [14] O. Matviyas, "Modern approaches to the methodology of teaching English in higher educational institutions," *Sci. Bull. Vinnytsia Acad. Contin. Educ., Ser. Pedagogy Psychol.*, no. 4, pp. 77–85, 2023. <https://doi.org/10.32782/academ-ped.psyh-2023-4.13>
- [15] A. Kamp, *Engineering Education in a Rapidly Changing World*, 2nd rev. ed. Delft, Netherlands: TU Delft, 2016. <https://doi.org/10.59490/mg.71>
- [16] A. Doff, C. Thaine, H. Puchta, J. Stranks, P. Lewis-Jones, and G. Burton, *Empower B1*. Cambridge, U.K.: Cambridge Univ. Press, 2022.
- [17] *English from 0 to B2: Advanced Lexical Course of English*. [Online]. Available: <https://www.youtube.com/channel/UCF9gPDPSh0djmvmv8ZyU6A>
- [18] *Foreign Language (Professionally Oriented) for Students of the Automotive Faculty*, 2022. [Online]. Available: <https://dl2022.khadi-kh.com/course/view.php?id=3214>
- [19] N. V. Saienko, *English for Automotive Engineers: A Textbook for Students of Automotive Specialties*. Kharkiv, Ukraine: KhNAHU, 2023. [Online]. Available: <https://dspace.khadi.kharkov.ua/handle/123456789/11215>
- [20] N. V. Saienko and V. Monev, *The Theory and Practice of Cross-Cultural Communication*. Kharkiv, Ukraine: KhNAHU, 2025, in press.
- [21] S. Mavridi and D. Xerri, *English for 21st Century Skills*. Newbury, U.K.: Express Publishing, 2020.
- [22] G. Kress, *Multimodality: A Social Semiotic Approach to Contemporary Communication*. London, U.K.: Routledge, 2010.
- [23] Association of College and Research Libraries, *Framework for Information Literacy for Higher Education*. Chicago, IL, USA: ACRL, 2016.

- [24] E. N. Gerasimov and M. E. Kudryashova, "Update and modernization of key concepts of the theory of pedagogical systems of V. P. Bespalko," *Universum: Psychol. Educ.*, no. 4(5), 2014. [Online]. Available: <http://7universum.com/ru/psy/archive/item/1210>
- [25] G. Holden, K. Barker, T. Meenaghan, and G. Rosenberg, "Research self-efficacy: A new possibility for educational outcomes assessment," *J. Soc. Work Educ.*, vol. 35, no. 3, pp. 463–476, 1999. <https://doi.org/10.1080/10437797.1999.10778982>