

# INCREASING FUTURE ENGINEERS' MOTIVATION FOR ACQUIRING ENGLISH LANGUAGE PROFESSIONAL COMMUNICATIVE COMPETENCE

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**Abstract.** *Modern engineers have to constantly upgrade their knowledge and skills to stay relevant in today's rapidly developing world and to establish professional ties with counterparts from other countries. It can hardly be done without knowledge of English as a dominant language of science and technology. Foreign language teachers in Ukraine and many other countries face the problem of improving technical students' communicative competence to such a level that they could become full-fledged participants in intercultural professional communication. The problem can be solved provided that students have strong positive motivation for learning a foreign language.*

*The aim of the study was to select and test a complex of methods to increase future engineers' motivation for acquiring foreign language communicative competence. These methods included problem-solving, case study, web-quest, dilemma, round table, essay, audiovisual translation, etc. The effects of the tried-and-tested methods were compared to the results of a traditional teaching.*

*The research was carried out at Kharkiv National Automobile and Highway University in 2021-2023 and aimed to compare 1) stability of students' cognitive interest; 2) disclosure of creative potential; 3) development of language skills of two groups of learners: the experimental group and the control group.*

*The results of the study indicate that the use of special methods to motivate students for language learning had a significant positive impact on future engineers' communicative competence.*

**Keywords:** *learning English, motivation, pedagogical experiment, technical students.*

## **Introduction**

The success of cross-cultural cooperation is largely determined by cultural adaptability of its participants: their tolerance, flexibility, ability to value the beliefs of others, and, of course, mastery of foreign languages, primarily languages of intercultural communication. The establishment and development of globalization ties are helped substantially by the wide use of the English language, which has a significant impact on both, the world community in general, and on the advances in science and technology, in particular.

Future engineers must be prepared to keep up with the development of technology, so they need not only fundamental knowledge and skills in the field of their specialty, but also information about the latest gains in this field, because, as research shows, now the obsolescence of scientific and technical knowledge makes up 20–30% per year. In 1982, Buckminster Fuller introduced his “knowledge-doubling curve.” He found out that until 1900 human knowledge doubled approximately every century. By the end of World War II knowledge was doubling every 25 years. To this, IBM added its post-1982 predictions, according to which, the development of information technologies will lead to the doubling of knowledge every 12 hours (Hassan, 2020).

That means that engineers have to constantly adapt and upgrade their knowledge and skills to stay relevant in today’s rapidly evolving world. It can hardly be done without knowledge of English, as within the last few decades, English has become the dominant language of science, with more than 90 % of the indexed scientific articles in the natural sciences published in this language (Ammon, 2012). English is of immense importance for engineers in publishing the findings of their research, and also for furthering their academic career, thus, it is indispensable for the people who have adopted engineering as their career (Shrestha, Pahari, & Awasthi, 2016).

Despite the evident importance of English, in reality language acquisition encounter some problems at Ukrainian technical universities, the main of which is students’ low motivation for language learning, that has always been a challenge for teachers and researchers.

The aim of the study was to identify means and tools to increase future engineers’ motivation for acquiring foreign language (FL) professional communicative competence. The narrower tasks of the study were: (a) to outline the demands for future engineers’ FL communicative competence; (b) to try and test experimentally methods for enhancing learners’ motivation; (c) to assess changes in indicators of motivation due to the use of these methods.

## **Literature Review**

Observations reveal that, although applicants enter a university with approximately the same level of knowledge, later they are divided into "strong" and "weak" students mainly due to the quality and type of motivation. This allows to assert that a high level of positive motivation for learning can compensate for the lack of abilities or knowledge and will become a kind of a compensatory factor if learning motivation is sufficiently developed.

Motivation has always been discussed as an important problem in the foreign language learning and teaching. Researchers believe that it “functions as an ongoing driving force that helps to sustain the long and usually laborious journey of acquiring a foreign language” (Cheng, & Dörnyei, 2007, p. 15); it can be defined as a motor because it etymologically “moves” us toward a goal, while also determining the intensity and duration of the movement (Caon, 2020).

The researchers consider various aspects of motivation and the ways of its development: effective motivational pathways in language learning environments (Muir, & Dörnyei, 2013); a multifaceted approach to language learning motivation through combination of complexity, humanistic, and critical perspectives (Pigott, 2012), self-motivation (Kimura, 2014); the role of self-theories in motivation, personality, and development (Dweck, 2000); the relationship between second language self-guides, language learning motivation and achievement (Demir-Ayaz, 2016), development of willingness to communicate in a second language (Yashima, Zenuk-Nishide, & Shimuzi, 2004), etc.

In general, scientists identify two main groups of motives that students are guided by during their studies – social (extrinsic) and cognitive (intrinsic) (Morris, Grehl, Rutter, Mehta, & Westwater, 2022; Marszalek, Balagna, Kim, & Patel, 2022).

The hierarchy of motives is based on internal motives, others perform an additional function of stimulating to actions. Intrinsic motivation is aimed at achieving inherent satisfaction from one's activities, for example, a sense of competence and self-determination. Extrinsically motivated activities are aimed at receiving external rewards or avoiding punishment (Morris et al., 2022), although it should also be taken into account, since there are many ambitious young people among students who pay considerable attention to such status markers as awards, diplomas, winning at competitions, receiving high grades for exams, etc. In addition, many students are interested in external rewards because information of them can be included in a graduate's CV, which is often seen by modern employers as an indicator of not only a student's abilities, but also of their potential.

Therefore, the teacher has to face the task of both the formation of intrinsic motives, and the skilful use of stimuli (extrinsic motives) in learning and extracurricular activities.

One of the main intrinsic motives is cognitive interest (Renninger, & Riley, 2013), which determines the quality of training. In order to satisfy learners' cognitive needs, those methods should be used that stimulate cognitive activity, arouse interest, help to establish an atmosphere of collective search, constructive tension, positive emotions, and creativity.

## **Methodology**

Educational programmes in language learning (LL) at a technical university consider as the desired result the formation of graduates' communicative competence, which will ensure their effective functioning in the cultural diversity of professional environments (<https://www.khadi.kharkov.ua/education/katalog-osvitnikh-program/>). Such LL is based on the main provisions of the Common European Framework of Reference for Languages: Learning, Teaching, Assessment (Council of Europe, 2001), which provide a standardized foundation for the development of university courses according to the professional needs of students and societal expectations.

In compliance with the Framework of Reference, the language learner is supposed to acquire linguistic, pragmatic and sociocultural competences, which are necessary for the performance of tasks related to study and work.

As for linguistic competence, which consists of lexical, grammatical, semantic, phonological, orthographic competences, teachers can hardly have any difficulties in designing courses, since there is a great number of excellent textbooks in this field. Pragmatic or professional communicative competence is formed in students of various specialties for narrow professional needs, and it is hardly possible to give common recommendations for training lawyers, economists, engineers or doctors. Therefore, it is quite natural that each department of foreign languages design their own courses of English for Specific Purpose to meet the needs of their students.

As for socio-cultural competence, it means the ability of understanding and interpretation of various aspects of culture, and presupposes the availability of skills to act appropriately in a cross-cultural situation. Since culture is a very broad concept that covers almost all spheres of life and cannot be fully learnt at an educational institution, language teachers are expected to develop their own resources by selecting and adapting materials from existing textbooks; using audio and video podcasts, mass media publications, Internet resources etc., to meet the needs of their students.

So, the tasks are multiple and challenging while the number of hours for LL at a technical university is limited, hence, this is motivation that can play a

crucial role in a successful language acquisition, therefore methods of motivating students to LL are in the process of constant improvement and enrichment.

In order to select and test the most effective methods of motivating students to acquire communicative competence, in 2021-2023 a pedagogical experiment was conducted at Kharkiv National Automobile and Highway University. An experimental group (EG) of students of various specialties (103 persons) was created, who were involved in classroom and extracurricular activities using modern innovative teaching methods, and a control group (CG) consisting of 100 persons, in which students were taught in a more traditional format. The students had one 90-minute lesson per week during three semesters.

To evaluate changes in the dynamics of motivation, the following criteria and indicators were chosen: 1) stability of cognitive interests (high, average and low levels); 2) disclosure of creative potential (full, partial, lack of disclosure); 3) development of communication skills (high, average and low levels).

The following indicators are characteristic of a *high level* of a cognitive interest development: the student works actively during the class, shows initiative and creativity, consciously strives for self-learning. An *average level* is characterized by situational interest depending on the degree of engagement with the material, by periodic prompts from the teacher, insufficient persistence in solving problematic tasks. A *low level* is characterized by the student's unwillingness to LL, attempts to avoid work. To test interest in learning English we conducted a survey using the Foreign Language Learning Motivation Questionnaire (Gonzales, & Lopez, 2016) adapted to our purposes.

The main indicators of a *full disclosure of creative potential* are a significant number of ideas that arise per unit of time; flexibility of thinking as the ability to quickly switch from one idea to another; unexpected decisions. A *partial disclosure* is a limited number of new ideas, a traditional approach to decision-making, unwillingness to take risks, caution in decision-making in a situation of uncertainty. A *lack of disclosure* of creative potential is revealed in the inability to generate original ideas, slowness of thinking, reluctance to participate in collective problem solving. In order to obtain data on the dynamics of unlocking creative potential we conducted a survey *the Creativity Styles Questionnaire* (Kumar, Riley Holman, & Kemmler, 1997).

We checked the development of language skills (speaking, reading, listening, and writing), which mainly indicated the level of *communicative competence*, with the use of IELTS Practice Tests (diagnostic and final). The levels of communicative competence were assessed by a 100-point scale: 90–100 points – a high level, 75–89 – an average level, 74 and below – a low level.

A *high level* of communicative skills means the ability to consistently develop oral and written expression with a sufficient degree of completeness and correctness; the ability to express an evaluative attitude to the subject of

communication. Students with an *average level* mostly act according to an analogy, a template, feel indecisiveness when establishing contacts. A *low level* of communication skills is typical for students who show an indifferent attitude to establishing contacts, show insufficient mastery of verbal and non-verbal means of communication.

At the ascertainment stage of the experiment, the initial level of motivation of students for acquiring communicative competence was diagnosed according to the predefined criteria. At the formative stage, various methods of increasing the stability of cognitive interests, unlocking creative potential and developing communication skills were tested; at the control stage, the results of the experimental work were summed up.

Among the methods, due to which cognitive interest went from a state of situational interest to the desire to self-directed studies, interactive technologies (Pometun, & Pirozhenko, 2004) proved their effectiveness in the classroom work and extracurricular activities, e.g., methods of cooperative learning: work in pairs, rotating (changeable) threes, “carousel” (inclusion of all participants in active work with different communication partners to discuss problematic issues), work in small groups, “aquarium” (a group of 4-6 students is separated from the rest of the group and discusses a debatable situation); interactive technologies of group learning: discussion of the problem in a general circle, “microphone” (everyone is given the opportunity to say something quickly, in turn, answering questions or expressing their opinion or position), “brainstorming”; simulations, role-playing the situation (acting out a scene, dramatization); a TV talk show style discussion, round table discussion, etc. For example, during the round table discussion on the topic “People who changed the world” the participants of the event discussed the following problems: Who makes history – individuals or nations? What do antiheroes teach us? Happiness in personal life and a great mission. Is this possible? A person becomes great if/when... Which of the famous people can be called a hero of our time? Explain why. Can a hero become an antihero and vice versa? Give examples. What distinguishes the heroes of today from those who lived 200 years ago? Are the categories of “hero” and “anti-hero” absolute? Who (or what) raises the hero? And so on.

During the training in intercultural communication, the following problems could be discussed: In your opinion, what personal qualities should a person who is going to rest in an international student camp have? How would you build a relationship of trust between you and your partners – representatives of other nationalities? Give examples of how personal relationships can help destroy stereotypes and improve mutual understanding between partners; What do you think are the stereotypes about your culture formed by representatives of other cultures? Give arguments “for” and “against” the adoption of bilingualism in your country.

A variety of problem-solving methods is the case study (an analysis of certain economic, legal, historical situations in which people's interests, life views, positions clash), for example: Company X. is a national leader in hybrid cloud computing with offices throughout the country and links abroad. The challenge is to enhance collaborating across offices as a quality work suffers from poor communication. The task was to develop a video solution to build stronger relationships across national and international offices.

As a means of activating the students' creative potential, we organized essay contests on various social and humanitarian topics (e.g. "Education today: the biggest threats and challenges") and contests for famous poetry pieces translations that aroused interest and enthusiasm among students.

Moral dilemmas that involved the students in solving complex life problems also sparked intense interest, for example: You plan to sell your old car to buy a newer model. The car is in a more or less decent condition, so you don't want to reveal the fact to a potential buyer that the car doesn't start well from time to time, and it has had an accident. Should you inform buyers that there may be problems with the car, or do you think that buying a used car is a matter of prudence and responsibility only of the buyer?

It is impossible to imagine the modern educational environment without digital technology that is becoming more and more sophisticated, its tools and applications can be used in and outside the classroom, in both formal and informal settings, in order to increase students' motivation (Panagiotidis, Krystalli, & Arvanitis, 2023). Information and communication technologies such as computer programs, virtual dictionaries, interactive maps, mobile applications and other resources made a significant contribution to increasing cognitive interests and unlocking the creative potential of the EG students, the most popular among were Quizlet (helps master English vocabulary with the use of flashcards and practice tests); Online Test Pad (tests both grammatical and analytical knowledge of English in a test form); MyEnglishLab (is a real hub of educational materials: exercises, audio, videos and tests); Kahoot and Wordwall (help create interactive educational games: quizzes, discussions, polls); the Internet site <http://www.bbc.co.uk/learningenglish>, etc. In addition, the British Council|LearnEnglish site, which offers plenty of useful materials for online learning was of great benefit.

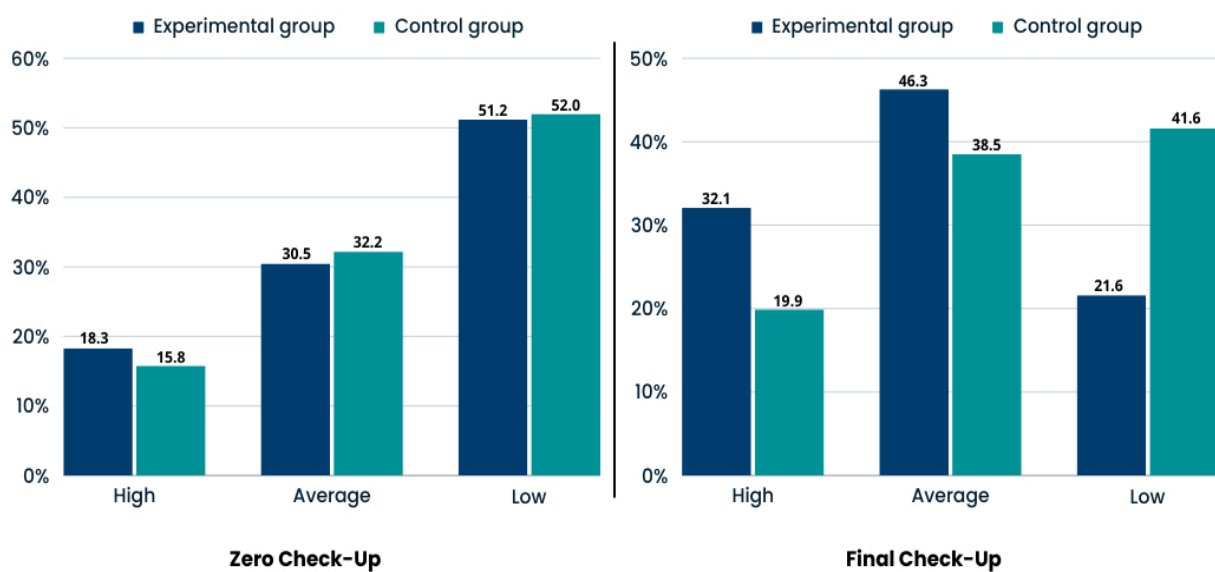
Also, as a part of extracurricular activity the students took part in web-quests (ideas were available on <http://www.tripadvisor.com>) that simulated real communication situations, taught the students to make decisions in conditions of everyday and professional life.

## Research Results

At the control stage of the experiment, the results of the experimental work were analyzed and summed up.

The obtained data suggest that a more significant positive dynamics was observed in the EG compared to the CG by all chosen criteria of the development of motivation for acquiring FL communicative professional competence.

Fig. 1 shows the dynamics of the changes in the character of students' cognitive interest.



*Figure 1 Trends in the development of cognitive interest (made by authors)*

A more expressed positive dynamics in the experimental group testifies that using various forms and methods of arousing cognitive interest: interactive methods, discussions, debates, role-playing, online technologies, virtual excursions, quests, etc. contributed largely to the development of positive motivation for acquiring FL communication competence.

The degree of the disclosure of creative potential was also more pronounced in the experimental group compared to the control group (Table 1).

The development of a person's creativity often depends on the environment in which it is formed, so the organization of the creative environment in our approach due to numerous problem-solving situations, case studies, writing essays, translating poetry, brainstorming, modelling of professional situations, creating videos, taking part in discussions contributed to unlocking students' creative potential, while the teacher performed the function of an adviser, a facilitator who creates an atmosphere of tolerance and mutual respect.

*Table 1 Trends in disclosure of creative potential (%) (made by authors)*



| Group<br>Degree of disclosure | E (103 pers)      |                  | C (100 pers)      |              |
|-------------------------------|-------------------|------------------|-------------------|--------------|
|                               | Before experiment | After experiment | Ascertaining data | Control data |
| Complete                      | 13.2%             | 32.1%            | 13.3%             | 20.1%        |
| Partial                       | 34.5%             | 47.8%            | 35.7%             | 49.2%        |
| Lack of disclosure            | 52.3%             | 20.1%            | 51.0%             | 30.7%        |

To obtain data on the dynamics of the English language communicative skills, the points for the IELTS diagnostic and final tests were compared and analysed.

When determining the level of development of communicative skills, we used a coefficient of assimilation of educational material, based on the methodology of Elnikova (1996), modified for our purposes. The results are presented in Table 2.

*Table 2 Dynamics of the levels of communicative skills development (%) (made by authors)*

| Group<br>Level | E (103 pers.)     |                  | C (100)           |              |
|----------------|-------------------|------------------|-------------------|--------------|
|                | Before experiment | After experiment | Ascertaining data | Control data |
| High           | 14.2%             | 31.0%            | 15,1%             | 26.3%        |
| Average        | 34.6%             | 44.9%            | 36,2%             | 41.7%        |
| Low            | 51.2%             | 24.1%            | 48,7%             | 32.0%        |

Due to the involvement of students in active creative and collaborative activities, the number of students with the high level of the development of communication skills, who regard communication as the basis of interaction, mutual understanding, exchange of information, and are willing to acquire communication competence increased significantly.

### Conclusion and discussion

Today, the professional activity of a technical university graduate is directly related to globalization processes and requires knowledge of the English language to be aware of the trends in the field of their specialization and to establish mutually beneficial relationships with counterparts from other countries. To make these relations deep, versatile and fruitful the specialist should be able to communicate in every-day situations to maintain personal

contacts, to discuss professional issues, to have a broad outlook and to express their opinion on various aspects of socio-cultural life.

Foreign language teachers face the problem of developing students' communicative competence (within a very limited period of time) to such a level that they could subsequently become full-fledged participants in the scientific collaboration and intercultural communication.

That means the necessity of students' strong positive motivation for LL, which, as shown by the results of this study, can be successfully developed due to the use of various methods that stimulate cognitive interest and creative activity of students, in such a way contributing to more effective acquisition of communication skills.

An important task of foreign language teachers is the development of educational programs that not only prepare for a career in a specific field, but also provide a basis for continuous learning throughout life, since a foreign LL is an area that requires constant and patient work in order to preserve and expand the knowledge and skills acquired in an educational institution. This aspect of technical students' training requires additional research, since a university graduate should have easy-to-reach and understandable resources to continue FL self-study.

Thus, the emphasis in education should be shifted from the mastery of knowledge to the mastery of the learning process itself to make students purposeful, proactive learners, who are ready to take responsibility for their self-development and professional self-actualization.

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