COMMUNICATION ASPECT OF LANGUAGE AND PROFESSIONAL TRAINING OF SPECIALISTS

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Abstract: The relevance of this study is determined by changes in modern professional and pedagogical issues, as well as the need to implement the ideas of modernizing the professional language education of a future specialist in the field of linguistics and intercultural communication and, in particular, the need to clarify the specific characteristics of professionally oriented language education at a university in accordance with specificity of the graduate's specialty. Based on a competence approach paradigm, educational vectors and technologies are considered to show the possibilities of achieving synergy effect in seamless integration of language and professional education, on the example of STEM field.

Keywords: communication aspect; education; communicative competence; STEM; synergy; science communication.

1 Introduction

Higher education institutions across the globe have been forced to reevaluate the overall orientation of their programs due to the introduction of new concepts and pedagogical principles brought about by an environment that is changing quickly. The three main factors impacting teaching and learning practices for "Knowledge Age" businesses are thought to be integration, convergence, and participatory learning. These factors are set up by globalization, the knowledge-based economy, and internationalization [23]. Teachers are actively urged to reconsider their courses in light of new educational ideas and objectives as they work toward achieving "excellence in education". They must attempt to steer the boat in the same direction as they set off on this new academic adventure, which means that all instructors in charge of courses in an academic program must plan their courses' structure and content in accordance with the program's overarching goals. Seeing the transition from a traditional knowledge-oriented educational philosophy to one that enables students to gain skills and competences is one of the main issues when it comes to repositioning and redefining academic programs and courses [7].

The professional competence of today's specialist is a complex multidimensional category, which is revealed in the form of a spectrum of individual key competencies, among which one of the first places is occupied by communicative competence with all its constituent components. Communicative competence is defined as the ability to use language correctly in a variety of socially determined situations. Communicative competence consists of several component competencies, among which the following stand out and form its main core: linguistic competence, discursive competence, sociocultural competence [30]. The future specialist must be a competitive person for whom language (both native and foreign) is necessary, first of all, for successful self-realization in professional activities. Figure 1 represents all the interrelated relationship of the aspects of communicative competence. Constructivist theory states that a clear emphasis on meaningful social interaction is how the discipline of language learning and instruction meets the twenty-first century [8].

Figure 1. Relationship in the aspects of communicative competence [15]

In language teaching methods, "communicative competence is the ability and real readiness to communicate adequately to the goals, areas and situations of communication, readiness for verbal interaction and mutual understanding" [31]. The ultimate goal of teaching students of non-linguistic universities a foreign language is the formation of the personality of a future specialist who has foreign language intercultural and professionally oriented skills for communicating in life and in professional activities with representatives of foreign cultural societies [4]. Therefore, this problem remains relevant as before and requires attention to the choice of linguodidactic and pedagogical conditions for the formation of students' communicative competence in the process of language and professional training as a single system.

There are a variety of pedagogical settings and teaching/learning strategies that are commonly chosen for effective foreign language learning. These types of activities that contribute to the progressive learning of language, as a rule, rely on speech activities and speech exercises, which play a large role in the development of communicative competence and communication skills, in comparison with which the strategies of imitation, memorization, and repetition of exercises mainly concern language and its structures, rather than using this language. A new trend in the last decade of the 20th century was the emergence of a communicative approach to language teaching, which recommends teaching a foreign language through communication or with the help of communication. Important achievements based on many years of experience of teachers in the field of teaching foreign languages help to form and develop communicative competence among students [1].

One of the pedagogical conditions that contribute to the formation of students' communicative competence based on student interaction is the creation of a communicative situation in accordance with the educational/professional problem. The communicative situation includes a set of specific objective and subjective factors, conditions, circumstances, relationships in which communication unfolds [32]. When forming a communicative situation, the teacher takes into account the place, time, participants, purpose, objectives, subject of communication, as well as the content of the material, and develops typical situations that shape specific communicative competencies. For example, these are situations caused by the formation of the general culture of the future engineer or manager, situations associated with future professional activities, situations caused by a communicative event (meeting, conference, etc.). Observations and studies of many teachers and methodologists have shown that teachers who stimulate closer linguistic interaction in the group achieve positive and effective results and prepare competent specialists who speak a foreign language [6].

Communicative consciousness, according to scientists, includes a set of communicative knowledge and communicative mechanisms that provide the entire complex of human communicative activities and communicative behavior. Each of

these concepts presupposes a process of human activity and compliance with socially accepted norms and rules of communication. At the same time, this also includes speech (language) norms and rules that are part of the life and activities of a given individual (group, society).

Numerous social, psychological, and linguistic research have examined a professional's communicative skill from a variety of angles. The development of skills to provide a socio-psychological forecast of a communication situation, program this process, acclimate to the atmosphere of the communicative situation, and manage the communication process of a group, collective, or team are associated with it by sociologists and psychologists [22]. In particular, managerial proficiency is required in a corporate communication setting.

The most crucial part of giving technical, pedagogical, medical, and other university students' general education and professional training is to support their overall development, enhance their language and communicative skills, and help them reach a level of business speech proficiency sufficient for them to actively and profitably participate in professional activities as future specialists.

The foundation of any professional activity is "competence", which refers to having cognitive knowledge in a certain field, and "competency", which refers to an area of concerns in which a person is knowledgeable. The development of communicative competency is an objective, a task, but above all, the challenge of educating future experts in any sector of work. This issue is especially pertinent in light of modern science and production, as well as the modernization of domestic education in all nations.

2 Materials and Methods

The methodological basis in the study is the provisions of a systematic approach to the analysis of social processes, phenomena, systems, as well as a communicative-activity approach, ideas of a holistic approach to the study of pedagogical systems, ideas of a competence-based approach, concepts of cultural and sociocultural foundations of the educational process.

The theoretical basis of the study also included the following provisions: pedagogical concepts of the formation of a person's individuality and his creative self-development, a model of a semantic paradigm in the conditions of specialist training, problems of the relationship between language and culture and intercultural communication.

3 Results and Discussion

The main goal of language training in a non-linguistic university today is the formation of intercultural, professionally oriented competence of students. When it comes to foreign language professionally oriented training, it acquires an even more integrated character, since the purpose of training is not so much the assimilation of language material, grammatical rules, linguistic and cultural information, the formation of speech skills and the development of language skills, the assimilation of the content of special professional information, but rather the formation of foreign language professional communicative competence, development of both abstract and professional thinking.

The advent of an era of real international interaction, cooperation, and collaboration has greatly aggravated the issue of teaching foreign languages, especially in technical universities, since it has become obvious that without university graduates' knowing foreign languages international interaction in various fields of economics, science, and technology is extremely difficult.

Specifically, the STEM fields are now global in nature; scientists travel the world to study their areas of interest and work with worldwide teams. For this reason, companies place greater value on multilingualism as The Joint National Committee for

Languages' Executive Director, Dr. Bill Rivers, provided an explanation: "Multilingual communication is intrinsic to today's scientific collaboration and progress, which means the language industry is fundamental to furthering every aspect of STEM professions and business" [19].

Many students find that applying their knowledge from one subject to another can greatly aid in problem-solving and success in new subjects. Research has also demonstrated that scientists and multilinguists are better at focusing, solving problems, and multitasking [30].

Fundamentally, STEM fields include formulating theories, conducting experiments, and drawing conclusions from the results. Although I understand that this may be difficult for certain students, there are many language skills that may be improved with this kind of exercise. These include gathering information from sources via listening to others, reading and analyzing texts and data sources, documenting experiments and hypotheses, recording results, and sharing and disseminating conclusions.

Recently, there has been an intensive increase in research that addresses the following problems: cognitive aspects of the formation of intercultural competence when teaching a foreign language at a non-linguistic university; development of professional competence of students of non-linguistic universities in the process of learning a foreign language; optimization of the process of teaching a foreign language in non-linguistic universities based on digital support programs, digital environment in the development of student autonomy; training in professionally oriented foreign language communication; project-based methodology for teaching English to engineering students; communicative capabilities of students at a non-linguistic university when studying foreign languages; formation of creative and communicative competence of students of non-linguistic specialties; formation of grammatical and discourse skills in students based on the cognitive approach; the possibilities of gaming and immersive technologies in language training and formation of communicative competence, etc.

At the same time, the development of communicative competence presupposes knowledge of philosophical, social, linguistic, personal approaches to the professional activities of future specialists, development of pedagogical foundations of professional skills, taking into account linguodidactic and management areas. At the same time, the problem-communicative principle and interactive methods of teaching disciplines become leading in teaching students.

According to the study by Aldelfer et al. [2], first-year STEM students who get Inclusive Scientific Communication Training (authors' developed teaching strategy) had higher self-efficacy and a stronger sense of identification as scientists and science communicators. The authors contend that while many STEM students do not receive sufficient training in these skills, it is imperative that STEM students be able to discuss science with a variety of audiences. Students who can effectively speak about science may experience a sense of empowerment as scientists and be able to better explain science to others in the community. The authors of the study created, carried out, and assessed a workshop that provided students with knowledge of and practice using inclusive science communication. The 50-minute lesson was designed to be included into already-existing STEM courses. There were four parts to this workshop:

1. Using the previously described principles of science communication, there will be a discussion of definitions and models of science communication.
2. Examination of case examples in science communication. Students were encouraged to talk on the effective and participatory scientific communication elements in these stories as well as the ineffective and deficit-based ones. These case studies were modified to meet the students' academic requirements.

3. Use a role-playing exercise to practice communication across disciplines and differences. The students were divided into groups of three and given a variety of "roles" to play, including microbiologist, journalist, teacher, doctor, and so on. The goal of the activity was to have the students discuss and come up with solutions for socioscientific problems like antibiotic resistance, clean energy, and food insecurity. Students were urged to be imaginative and to understand that in order to address complicated problems, a variety of viewpoints are required.

4. Discussion with peers about their opinions on a scientific subject is one way to start a strategy to become a science communicator in the upcoming month.

The workshop's overarching objective was to assist students in appreciating the importance of varied viewpoints and backgrounds in co-creating solutions to socioscientific problems [2].

Science self-efficacy and science identification are two examples of student emotional measures that are linked to STEM persistence. Aldelfer et al. quantified these measures and shown that the workshop raised these measures for both students who do not hold these identities and students who do hold them. Additionally, they evaluated the open-ended responses from students on themes associated with the Theory of Planned Behavior, Community Cultural Wealth, and White Supremacy Culture. They discovered that while power disparities, conflict aversion, and perfectionism served as obstacles to science communication behaviors, other forms of cultural capital enabled students to engage in these activities. This study emphasizes how crucial it is to give undergraduate STEM students specific instruction and experience in inclusive science communication. The findings also imply that for students to grow in their sense of self and confidence as scientists and science communicators, they must have the chance to engage in reflexivity, or the habit of thinking back on their motives and identities.

Naturally, the educational value of such trainings can be significantly raised if they are conducted within foreign language teaching landscape. In this case, there would be a synergy due to combining three components of competence – professional, communicative, and language.

Other researchers have observed that when English language learners (ELs) participate in activities that STEM experts and professionals regularly engage in and engage in meaningful classroom interaction, they acquire language proficiency and science, technology, engineering, and mathematics (STEM) knowledge [16].

It should be mentioned that language and subject courses have historically coexisted in academic programs without having a clear relationship. According to this division, teaching topic is "the real intellectual challenge", whereas teaching language is "practical and technical" [10]. Globalization and the emphasis on the information economy, however, need reevaluating the overall orientation of academic programs and the tenets of individual courses. This requirement also reflects the change in educational philosophy away from a traditional knowledge-based approach and toward emphasizing the development of students' skills and competencies. This method calls into question the nature and focus of academic programs in foreign language and cultural studies. Cabau [7] uses a case study of an undergraduate European studies program in Hong Kong that combines social science and rigorous language training as two majors to demonstrate this point. This unusual combination is intended to foster students' enthusiasm and language learning by combining academic fields in a productive way. The two educational axes of the Common European Framework of Reference for Languages - the action-oriented approach and the idea that language learners are social agents - as well as the Content and Language Integrated Learning (CLIL) method lend credence to this pedagogical viewpoint.

The unsatisfactory outcomes of FL teaching, the knowledge that longer instruction times do not always translate into higher student proficiency, and the demand for improved language and communication learning outcomes have all contributed to the implementation of CLIL programs. According to experts, university students studying abroad fall short of their academic potential due to ineffective coordination between language and content teaching and learning as well as students' passivity in content classrooms, which are typically marked by a high percentage of teacher talk and few opportunities for student response [5]. Without adding more classes to the curriculum, the greatest approach to increase students' exposure to the target language and enhance their FL competency is through the introduction of CLIL programs. Language is viewed as a tool, not merely a goal, in the CLIL approach. In addition to enhancing oral communication abilities and language proficiency, the CLIL methodology expands possibilities for exposure to and practice in the target language/culture, as well as fostering a deeper comprehension of academic, communication, and foreign learning cultures. Additionally, it fosters the growth of intercultural knowledge and comprehension, intercultural communication abilities, and chances for material study from many angles, all while boosting student motivation and self-assurance in the language and the subject matter being taught [12].

The most evident difference between language and substance is probably this one. In mathematics, terms are employed differently than in science. However, take into account the various ways that meaning is presented and enacted; for instance, writing instead of speaking, and the various wordings that depend on the relationship between the speakers - for instance, speaking in a small group or one-on-one. Adding new registers and developing current ones is a major goal of the education process (see Figure 2) [13]. Since the registers employed respond to the settings participated in, designing situations to allow students to extend their language repertoires is an important goal of instruction in all courses.
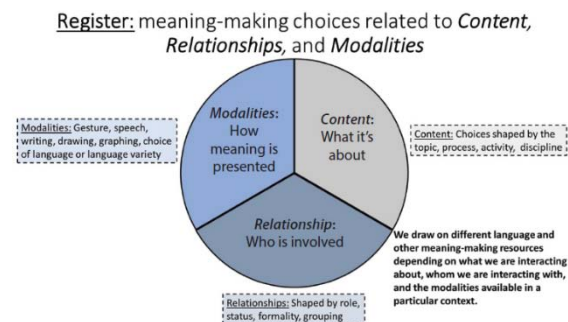

Figure 2. A perspective on language as variation in Register
[13]

At the same time, the concept of "readiness for foreign language communication" still remains insufficiently covered and substantiated. And although this reality is relatively often commented on in the pedagogical and psychological literature, there are still not enough scientific works devoted to studying the essence and conditions for the establishing of this phenomenon. As an analysis of the existing scientific literature fund has shown, aspects of taking into account the theoretical foundations of the formation of readiness for professional foreign language communication of future specialists, their specifics have not yet been properly reflected in the scientific pedagogical and psychological literature.

Meanwhile, foreign language communicative competence is an integral characteristic of a specialist's professional activity, which covers the following substructures: activity (ability, knowledge, skills, and methods of carrying out professional activities); communicative (ability, knowledge, skills, and methods of professional communication).

Knowledge of the language, a high degree of practical proficiency in both verbal and nonverbal means, and experience in language proficiency at a variable-adaptive level depending on the particular speech situation are all considered components of "foreign language professional competence" in contemporary research [14]. Communicative competence, a qualitative trait of a specialist's personality that includes a set of theoretical and scientific knowledge, practical skills in the field of professional communication, experience in professional interaction, and long-term motivation for professional communication, is a crucial structural element of professional competence.

Moreover, interpersonal verbal interaction, "sociality" itself, not only now plays a large role in the workplace context, but it is already replacing previous standards of rationality and formality. Thus, a new "social morphology" is formed by cooperative networks; network integration is achieved and maintained through a form of interaction that can be characterized as "working through communication" [25]. Personal resources include the ability for mutual understanding, flexibility of thinking, breadth and depth of argumentation, high semantic and speech qualities, the ability to justify and make decisions in conditions of uncertainty and time pressure [27]. In this landscape, applied linguistics, namely its communicative functions, including within the framework of sociolinguistics, becomes important for the educational process and the formation of the necessary competencies.

The most important property of applied linguistics methods is optimization. Optimization is understood as such a description (model) of a problem area in which this area retains in the resulting representation only those essential properties that are necessary for a given practical problem. In other words, while theoretical research requires a complete description of the problem area with all its complexities, the applied optimized description must be satisfactory only for this specific task.

From a functional point of view, applied linguistics can be defined as an academic discipline in which ways to optimize various areas of the functioning of the language system are purposefully studied and developed. The functions of language set the reference points for the classification of a huge area of application of linguistic knowledge. Disciplines such as translation theory, machine translation, the theory and practice of teaching native and non-native languages, the theory and practice of information retrieval systems, the creation of information and, more broadly, artificial languages, and coding theory contribute to the optimization of the communicative function [9].

At the same time, ICT serves as an interactive space for the implementation of methodological and pedagogical learning goals, teacher creativity, and optimizes the system of organizing and monitoring students' work in learning both a language and a profiling specialty, make it possible to effectively organize classroom and extracurricular work, and also allow managing the independent work of students. However, when selecting educational material for a lesson using ICT, the teacher should observe the basic didactic principles: systematicity and consistency, accessibility, differentiated approach, scientific nature, etc.

Immersion technologies have a unique significance. Immersion technologies, in particular, are changing STEM education by improving performance and engagement. Combining VR and AR into teaching has the potential to raise student motivation, increase understanding of difficult ideas, and enhance collaborative learning opportunities [28]. For varied educational contexts and the quick pace of technology innovation, the discipline does, nevertheless, require a globally inclusive and flexible framework. The inclusion of linguistic communication techniques can facilitate this framework. As demonstrated by the favorable effects on student engagement and performance documented in the literature, immersive technologies like VR and AR have the potential to revolutionize STEM education [26; 29]. Educators and researchers can drive STEM education

toward a more personalized, interactive, and successful future by building on these technologies with a mindful approach toward inclusivity, adaptability, ethical considerations, and intercultural awareness in addition to language proficiency [24].

Research indicates that augmented reality (AR) technology not only supports language acquisition but also improves learners' communication and cultural comprehension [17]. The University of Hawai'i at Mānoa students were given a new and engaging learning environment in the form of an augmented reality mobile game called Guardians of the Mo'o, which is a gecko or Lizard Goddess in Hawaiian culture. The game allowed the students to interact with both the virtual and physical worlds, such as virtual drawings, notes, and artwork on campus, encouraging active language learning and raising cultural awareness. Liu et al. (2016) [17] discovered, using conversation analysis and multimodal analysis, that learner active learning occurred as a result of cooperative bargaining and cooperation amongst team players in order to tackle the challenges jointly. With the presence of multimedia acting as scaffolding, background knowledge activator, motivator, and facilitator, learners can apply what they have learned to the augmented reality and make sense of the real world in an interactive learning environment created by this innovative technology when used meaningfully.

Because they engage students in a way that is behavioral, cognitive, and emotive, mixed reality (MR) technologies - which frequently combine elements of virtual reality (VR) and augmented reality (AR) - are growing in popularity in educational settings.

Through the practice and understanding of nonverbal communication in a simulated environment provided by VR, students can gain confidence in real-life interactions. Virtual reality also removes the anxiety of making mistakes when communicating with foreigners, creating a secure environment for language practice [21; 33].

With the ability to communicate with virtual native speakers, take part in realistic dialogues, and traverse real-life circumstances, virtual reality (VR) provides a platform for students to learn language in an authentic way [11]. Students gain confidence and fluency in their target language through real-world practice in a simulated setting, which is beneficial for their professional careers [18].

While global collaboration through virtual interactions, or global PBL, offers students special opportunities to practice communication in STEM subjects by utilizing videoconferencing and Learning Management System technologies, bridging classrooms internationally, PBL has been shown to be successful in improving students' communication skills. The synergistic impacts of global PBL on students' development of STEM communication skills are reported by Owens and Hite [20].

Another powerful tool for conveying difficult ideas and concepts in a relatable and interesting way is storytelling. By incorporating narrative strategies into language and professional education, students may communicate their ideas to a variety of audiences [3]. Encouragement of public speaking should also be brought up. For STEM workers, public speaking is a crucial communication skill since it enables them to share their concepts and discoveries with audiences that are both technical and non-technical. Giving students the chance to practice public speaking through debates or speeches can help them feel more at ease and confident in their capacity for effective communication.

Interacting with the media is an important tool for combining professional training with language in a synergistic way when it comes to the communication component. Students' capacity to explain their work to the wider audience can be improved by teaching them how to engage with the media. Through adept handling of interviews and persuasive research presentation, they can support more truthful and impartial media portrayals of professional domains.

Encouraging students to take part in science communication groups, contests, or events is also a good idea as they can offer excellent chances for them to hone their communication abilities. These extracurricular activities can ignite a passion for communicating in other languages and help students develop their communication skills by encouraging them to think outside the box when it comes to how they might explain their scientific knowledge.

Creating educational experiences that are both successful and captivating requires a close relationship between learning objectives, pedagogies, and technologies. These three elements working together ensures that the tools and methods of instruction chosen will help students meet their predetermined learning objectives. The instructional methodology should be easily connected with the technologies being used. They should not be used just for the sake of technology, but rather to support and improve instructional strategies. Collaboration technologies have the potential to foster online discussions and actively engage students, while adaptive learning platforms can provide personalized content tailored to each student's performance and growth.

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