

# Simulation-Based Learning as an Effective Method of Practical Training of Future Translators

Mykhaylo M. Kozyar<sup>1,\*</sup>, Susanna M. Pasichnyk<sup>2</sup>, Marianna M. Kopchak<sup>3</sup>, Nataliia S. Burmakina<sup>4</sup> & Tamara Suran<sup>5</sup>

<sup>1</sup>Department of Applied Psychology and Pedagogy, Institute of Psychology and Social Protection, Lviv State University of Life Safety, Lviv, Ukraine

<sup>2</sup>Foreign Languages and Military Translation Department, Hetman Petro Sahaidachnyi National Army Academy, Lviv, Ukraine

<sup>3</sup>Department of Foreign Languages of the Faculty of International Relations, Faculty of International Relations, Ivan Franko National University of Lviv, Lviv, Ukraine

<sup>4</sup>Department of Foreign Languages, Faculty of Economics and Management, Polissia National University, Zhytomyr, Ukraine

<sup>5</sup>Department of Slavic Philology and World Literature, Faculty of Philology, Uzhhorod National University, Uzhhorod, Ukraine

\*Correspondence: Department of Applied Psychology and Pedagogy, Institute of Psychology and Social Protection, Lviv State University of Life Safety, 35 Kleparivska St., Lviv, 79007 Ukraine. E-mail: myhaylo.kozyar@gmail.com

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## Abstract

The research topicality is determined by the problem of lack of qualified specialists who have a high level of foreign language proficiency and the ability to carry out effective professional foreign language communication. The study involved the following methods: Rokich's Value Orientations Test, Nemov's methods for diagnosing the expectation of success level, the Self-Efficacy Scale (R. Schwarzer, M. Jerusalem); testing on the material taught on the Theory and Practice of English Translation, chi-squared test, Mann-Whitney U test. Results: Simulation of real conditions and situations of translation activity is used in almost every lesson (80%), promoting the development of future translators' professional competencies. The final control in the experimental group found that all students had a high (48.10%) or medium (51.30%) level of foreign language proficiency, which confirms the effectiveness of the simulation method. In the experimental group, the percentage of students with a low level of foreign language proficiency at the end of the research decreased from 26.3% to 0.6%, and the percentage of students with a high level of foreign language proficiency almost tripled. At the same time, in the control group the number of students with a low level of foreign language proficiency decreased from 25% to 10%, while the percentage of students with a high level of foreign language proficiency increased by only 1.6 times. Therefore, the hypothesis of this scientific research was experimentally confirmed. Simulation training promotes the development of foreign language competencies of students majoring in Translation.

**Keywords:** higher education, learning technologies, practical training, simulation-based learning, translator training

## 1. Introduction

The research topicality is determined by the problem of lack of qualified specialists who have a high level of foreign language proficiency and the ability to carry out effective professional foreign language communication. These requirements are the key to the success of the modern specialist in the field of translation, as well as a prerequisite for the dynamic development of the domestic educational field (Usmanova et al., 2021).

The requirements of the international labour market determine the need for modern approaches to language training of high school students. This trend is related, on the one hand, to the introduction of new educational standards in the higher education system, on the other hand — to quality innovations in education in general. These changes reflect the high interactivity, communication, mobility of acquired knowledge in modern society. So, the system of professional education is faced with the task of creating conditions for rational choice and non-standard combination

of approaches to learning. This is necessary for effective linguistic and professional education of future highly qualified translators competitive in the labour market (Pyankivska, 2018).

In order for a teacher to be able to act not according to the classic proposed rules, but in accordance with his/her own choice, he/she must effectively combine innovative, modern and traditional teaching systems. Simulation-based learning seems to be the most effective method, following the principles of continuity and respect for the historical foundations of their profession, the system of professional education and language didactics (Vargas-Sierra, 2019).

Most students would like to work in leading foreign companies after graduation, and proficiency in a professional foreign language will help fulfil their desires. This will increase the competitiveness of graduates in the labour market. Employers not only hire specialists with professional skills, but who also master the techniques of effective strategic professional communication in both native and foreign languages. Therefore, it is necessary to teach future translators the skills and abilities to use a foreign language as a means of making professional decisions at both operational and managerial levels. This should be taken into account in the implementation of training programmes aimed at modelling production activities as close as possible to real professional conditions (Schaeffer et al., 2020).

The priority problem in the system of training future translators is the insufficient level of interaction between teachers of specialized subjects and foreign languages in the process of designing the linguistic-professional content of education. This allows determining clear requirements for the level of foreign language proficiency, developing successive interdisciplinary programs at all levels of professional education (Nazarova, 2020). This should take into account technological, socio-economic and other requirements, adapt innovative and traditional pedagogical technologies and teaching methods, tools for monitoring and diagnosis. In this context, the scientific substantiation and development of a foreign language curriculum that integrates communication and operational-technological modules becomes a particularly important task of the higher education system. This should be based on simulation modelling of linguo-communication problems. An example of such teaching methods is language simulation, which adapts the potential of both traditional communication and the latest interactive technologies (Fedoruk et al., 2021).

According to researchers, educational simulation is a means of enhancing professional foreign language communication and is a tool for building competencies that ensure professional success. These include skills of effective communication, persuasion and literate expression of tolerance, tolerance, rapid adaptation to innovation and change, high mental and emotional resilience (Kriuchko, Kushnerova & Harshman, 2018).

Simulation-based learning introduces students to scenarios and environments designed to accurately approximate real situations. This training program was first used in high-risk industries such as aviation, nuclear power engineering and military operations. Subsequently, this type of practical training was adopted in language education, which provides an opportunity to acquire competencies in such aspects as speech skills, technical procedures, behaviour and skills of interprofessional communication. Through simulation-based learning, students learn professional situations without leaving the classroom (Zhadko, Bidzilia & Didyk, 2018).

The aim of the pedagogical research was to test the effectiveness of the developed model of approaches to the informatization of the system of teaching Russian as a foreign language to medical students to prepare them for clinical practice. This aim involved the following objectives:

1. Study the effectiveness of the simulation-based learning model for students majoring in Translation for their professional training;
2. Verify the conditions for the development of speech activity and communicative competence of students majoring in Translation.

## 2. Literature Review

The problem of simulation-based learning has been studied by a number of domestic and foreign scientists. Briales, Filsenger and Alonso (2018) pay special attention to the problem of student decisions in learning translation. The authors emphasize creative techniques that students use in self-study of educational material. The authors pay special attention to the comparison of different teaching methods and analyse the attitudes of both students and teachers. Deraniyagala Amdur, Boyer and Kaylor (2015) consider the practical use of EduMod software in their work. The authors pay attention to the study of specialized software for simulation-based learning. In particular, the authors compared different means of simulation-based learning. The study of Esfandiari, Shokrpour and Rahimi (2019) is worth mentioning, which covers the development of simulation-based learning technologies. In particular, the authors draw attention to the compatibility of simulation-based learning with the needs of the development of future translators' professional competencies. The authors conclude that the educational simulation is highly effective.

Friederichs, Marschall and Weissenstein (2019) and Grant et al. (2018) consider the simulation method as a basic model in the training of health workers. The authors note the high level of efficiency of the simulation method for the development of future doctors' professional competencies. The main advantage of the simulation method in this area is the acquisition of competencies without any risks for patients. It should also be noted that it is from the medical field that the simulation method has spread to other areas. Huang, Chen, Yang and Chang (2013) investigate computer translation systems. The authors consider the possible forms and uses of such systems in the future translators' training. In her work, Tropina (2017) considers simulation learning as the latest technology in economic education. The researcher emphasizes the effectiveness of the method, noting that the future specialists are trained under the conditions as close as possible to real professional activity. Also, the need to introduce the simulation method in the educational process was considered in the works of such scientists as Muñoz-Miquel (2018), Olalla-Soler (2018, 2019), Vargas-Sierra (2019). In their research, the authors note the need to use the latest educational methods and pay special attention to the simulation method. The effectiveness of the method is seen in the maximum approximation of student training to real working conditions without any threats and restrictions.

In this regard, there are contradictions between:

- Changes in the professional activities of translators in the context of digitalization of the economy and insufficient scientific, theoretical and practical development of substantive and technological aspects of student training;
- Modern requirements for the future translator, capable of continuous professional development in the professional environment and the existing forms and self-study methods used by students of higher educational institutions (HEIs);
- High potential of independent work on the use of interactive e-learning platforms in the development of students' readiness for continuous self-study and insufficiently developed pedagogical conditions for the realization of these opportunities.

The considered contradictions determine the problem of research which consists in insufficient theoretical substantiation and practical realization of potential of independent work with the use of the simulation method. Modern information and communication technologies, as well as technological platforms for e-learning are insufficiently used to improve the quality of future translators' education.

### 3. Methods

#### 3.1 Research Design

Experimental work on the training of students majoring in Translation through simulation-based learning was carried out in several stages:

Stage 1 involved:

- developing the indicators of manifestation of the components of competence in students majoring in Translation;
- development of generalized characteristics of the levels of each component of competence;
- selection and development of diagnostic tools for assessing the degree and dynamics of the levels of professional foreign language competencies.

Stage 2 involved:

- conducting a study of the initial state of the level of professional foreign language competencies of students majoring in Translation;
- determination of the stages of the formative experiment on the basis of the obtained results.

Stage 3 involved:

- conducting formative experiment;
- control study, comparative analysis of the data obtained;
- generalization and summarizing.

The null statistical hypothesis  $H_0$  is that the development of foreign language competence does not depend on the teaching method. An alternative statistical hypothesis  $H_1$  is that the development of foreign language competencies using the method of simulation-based learning is more effective.

### 3.2 Sample

The research was conducted at the Faculty of Translation Studies of Kyiv National Linguistic University with bachelors majoring in Germanic Languages and Literature (Translation included). The sample consisted of 142 people — senior full-time students. The control group was represented by 72 students, the experimental one — by 70 students. Respondents were selected by lot among students of the Department of English Philology and Translation. An expert group of 15 teachers from the Department of English Philology and Translation was involved.

### 3.3 Methods

1. The level of future translators' professional competencies was diagnosed through testing according to the criteria presented in Appendix A. The following methods were used: Rokich's Value Orientations Test, Nemov's methods for diagnosing the expectation of success level, the Self-Efficacy Scale (R. Schwarzer, M. Jerusalem).

2. The testing includes assignments on the material taught on the Theory and Practice of English Translation. The assessment involved an expert group. The test contains the following blocks: questions on grammar, phonetics, vocabulary (basic and business). A four-point grading system ("2", "3", "4", "5") was used to assess the initial level of communicative competence of students majoring in Translation based on the test results. The maximum number of points that a student majoring in Translation could score according to three criteria is 15. The assessment was carried out on the following scale: 15-13 points — high level, 12-10 points — medium level, 9 points — low level (Plomp, 2020)

Theoretical knowledge was assessed by indicators of completeness and strength of knowledge, then the assessment of the criterion was correlated with the overall assessment of the student's foreign language proficiency in identifying the following areas:

- knowledge of professional concepts in a foreign language;
- ability to conduct a dialogue;
- vocabulary range;
- accuracy of the use of language units;
- speed of speech;
- the degree of interaction with the interlocutor;
- language coherence, etc.

3. In the course of experimental work, statistical processing of the obtained data was performed using  $\chi^2$  (chi-squared test) at the level of  $p \leq 0.05$ . The chi-squared test is used to compare the distribution functions of objects in two sets by the state of a feature based on measurements of that property in two independent samples.  $\chi^2$  is calculated by the formula:

$$\chi^2 = N \cdot \left[ \sum_{j=1}^m \left( \sum_{i=1}^n \frac{x_{ij}^2}{Q_i \cdot R_i} \right) - 1 \right] \quad (1)$$

where N — the total number of students who participated in the formative stage of the pedagogical experiment;

m — the number of possible values of the first feature;

n — the number of possible values of the second feature;

$x_{ij}$  — the number of combinations of the  $i^{\text{th}}$  value of the first feature with the  $j^{\text{th}}$  value of the second feature;

$Q_i$  — the total number of observations of the  $i^{\text{th}}$  value of the first feature;

$R_i$  — the total number of observations of the  $j^{\text{th}}$  value of the second feature.

4. The calculation of the statistics of the Mann-Whitney U test is based on the formula:

$$U = (n_1 \times n_2) + (n_x \times (n_x + 1) / 2) - T_x, \quad (2)$$

where  $n_1$  — the number of respondents in the experimental group;

$n_2$  — the number of respondents in the control group;

T<sub>x</sub> — the larger of the two rank sums;

n<sub>x</sub> — the number of respondents in the group with the largest rank sum.

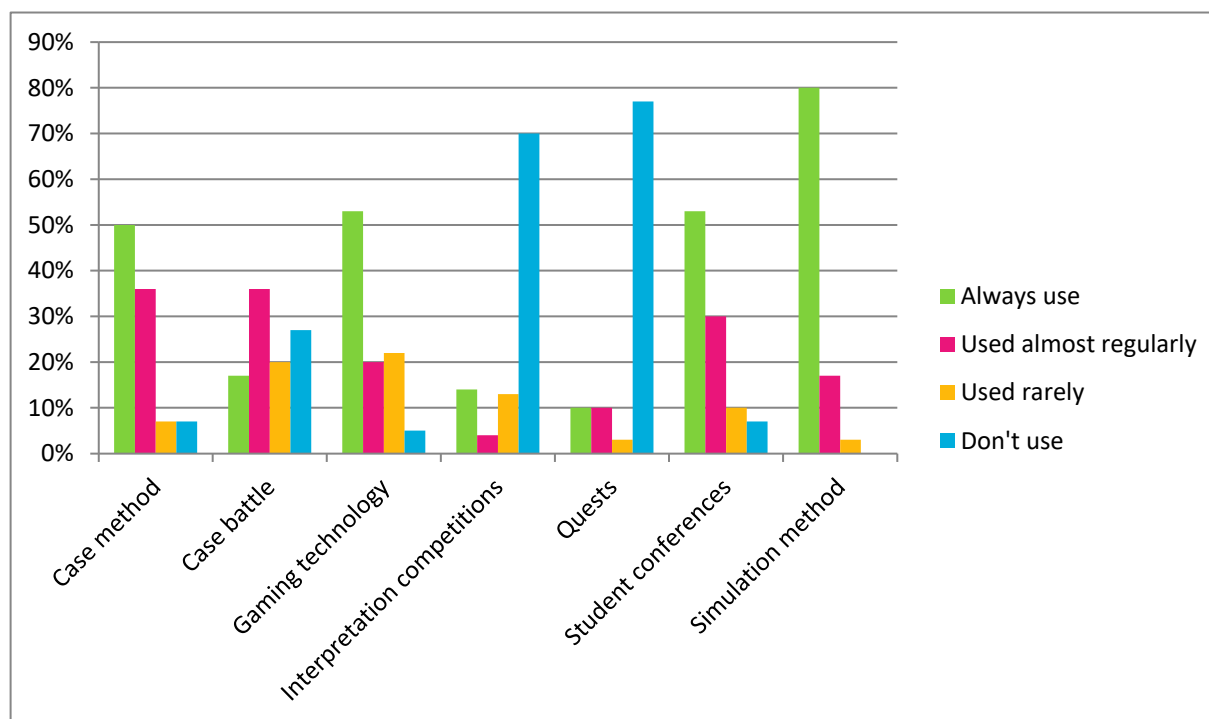
The research design is based on the principles of respect for the individual, gender equality, anti-discrimination on any grounds, validity, professionalism, consistency of conclusions. All stages of the pedagogical experiment correspond to the generally accepted academic ethical principles of research work. All respondents were given notice of the need to answer test questions honestly. The respondents have given their consent to the processing of personal data and the publication of research results in scientific papers. The article involves reliable research methods and data processing tools.

### 3.4 Instruments

Google Forms were used for the survey. Data entry and processing was performed in Microsoft Excel and SPSS Statistics 19.0. All data are given in absolute (number of choice of answers) and relative (% of the number of respondents) values.

## 4. Results

The study of interactive methods that the students used during training allows determining the current stage of using educational simulation. Figure 1 illustrates the answers to the question of which of the listed interactive methods, technologies and forms in learning translation students use.



**Figure 1.** Interactive Methods Used by Students During Translation Studies

Source: Authors

The chart (Figure 1) shows that the consider the following to be the most effective in teaching translation:

- Case method (50% of respondents use in each lesson), which involves students in a group discussion in the course of a case study, which aims to collectively search for new ideas, identify ways, choose mechanisms and technologies for solving cases. Case study develops the creative component of the student’s personality, forms new knowledge, professional skills and professionally significant qualities;
- Game technology (53% use almost every lesson), the purpose of which is to set educational and game assignments, as well as their joint solution by students in a foreign language;

- Student conferences (53% use in almost every lesson) contribute to the acquisition of new skills and abilities, the identification of professional inclinations. They use the case method, case battles, gaming technology, translation competitions, quests, student conferences, simulation of translation situations in almost every lesson;

- Simulation of real conditions and situations of translation activity (80% use in almost every lesson), which promotes the development of professional competencies. The fact that respondents do not practice interpretation competitions (which was indicated by 70% of all respondents) and translation quests (77%) undoubtedly indicates that this format is time consuming.

Student conferences and a simulation method dominated in the answers, which, from an organizational point of view, are easier to implement and fully imitate real translation activities. Interpretation competitions and translation quests are, unfortunately, ignored, as such events are more difficult to conduct in classrooms due to their complexity. The respondents, however, say that there are various difficulties in using interactive methods, technologies and forms in translation classes.

The respondents identified the following problems:

— “it is difficult to involve all students, not the same — the most active”

— “it is difficult to involve students and intensify their activities”;

— “material and technical difficulties: the need for special equipment for the audience; ensuring the required number of participants; lack of students’ readiness to interact; if the program is intense, there may be a problem of lack of time”;

— “preparation of such a lesson takes a lot of time (search for materials, conference organization, search for speakers)”;

— “high pace of work in the classroom according to the plan; insufficient number of hours allocated for the subject”;

— “insufficient teaching experience in the field of translation”.

Note that the problem of motivation is really one of the most important. Different students have different motivations. The teacher’s objective in this case is to strengthen motivation and prepare students who are able to learn independently and solve problems. Positive motives, the use of which is aimed at achieving positive results, are the most effective.

The obtained results were taken as the initial level of foreign language training of students, which served as the basis for their division into groups — experimental (EG) and control (CG). Table 1 shows the results of the summative experiment. For the convenience of summarizing and identifying the dynamics of each group, the total average value was calculated by the sum of the values of all criteria.

**Table 1.** The Level of Foreign Language Competence of Students Majoring in Translation at the Summative Stage

	High level		Medium level		Low level	
	EG	CG	EG	CG	EG	CG
Motivational and target	10%	12.5%	65%	67.5%	25%	20%
Procedural and activity	7.5%	7.5%	55%	57.5%	37.5%	35%
Communicative and creative	5%	5%	60%	57.5%	35%	37.5%
Performance and evaluative	30%	30%	62.5%	62.5%	7.5%	7.5%
Integral	13.10%	13.80%	60.60%	61.20%	26.30%	25.00%

Source: Authors

Upon analysing the results and summarizing the results of the summative part of the experiment, the control group followed the approved methodology in their studies, while the experimental group followed the pedagogical target programme to improve students’ foreign language proficiency through simulation-based learning. The main objective of the practical and modelling stage was the implementation of the pedagogical target programme to improve students’ foreign language proficiency through simulation-based learning. The structure of the programme consists of three modules: the first (mastering), the second (integration), the third (development).

Psychological and pedagogical measures were taken throughout the period of experimental work to develop students’ ability to analyse their own cognitive activity, its results and formative factors, as well as to compare the quality of

the result with the intended goals. This type of activity allowed students to lay the foundations of reflection, involving them in the process of more complete immersion in the development of self-actualization. Students of the experimental group were actively involved in the creation of educational and informational material on foreign languages and other subjects being studied, taking into account their use in the future translators' foreign language training. At the end of the experiment, all the results were converted according to selected methods in accordance with the defined criteria and indicators, summarized in Table 2.

**Table 2.** The Level of Foreign Language Competence of Students Majoring in Translation at the Final Stage of the Experiment

	High level		Medium level		Low level	
	EG	CG	EG	CG	EG	CG
motivational and target	42.5%	17.5%	57.5%	77.5%	-	5%
procedural and activity	45%	20%	55%	70%	-	10%
communicative and creative	37.5%	15%	60%	67.5%	2.5%	17.5%
performance and evaluative	67.5%	35%	32.5%	57.5%	-	7.5%
integral	48.10%	21.90%	51.30%	68.10%	0.60%	10.00%

Source: authors

The results presented in the table show that there is a progressive dynamics in both the experimental and control groups, but it is much higher in the experimental group. The final control in the experimental group found that all students have a high or medium level of foreign language proficiency, which confirms the effectiveness of the simulation method. Besides, the analysis of the results of the control group should take into account that the daily communication of students based on personal interests contributed to their involvement, one way or another, in activities related to the implementation of pedagogical target programme. This, most likely, influenced the development of interest in certain aspects of foreign language activities, increasing the level of professional motivation and forming a stable opinion about the wide range of opportunities for the application of foreign language knowledge in further work within their speciality. Table 3 presents a chart showing the integrative criterion at the beginning and end of the experiment.

**Table 3.** Dynamics of Change of the Integrative Criterion of Students Majoring in Translation at the Beginning and at the End of the Experiment

	High level		Medium level		Low level		$\chi^2$
	EG	CG	EG	CG	EG	CG	
Beginning of the experiment	13.10%	13.80%	60.60%	61.20%	26.20%	25.00%	0.09
End of the experiment	48.10%	21.90%	51.30%	68.10%	0.60%	10.00%	

Source: Authors

So, we can conclude that the results of the experimental group far exceed those of the control group. In the experimental group, the percentage of students with a low level of foreign language proficiency at the end of the study decreased from 26.3% to 0.6%, and the percentage of students with a high level of foreign language proficiency increased almost 3 times. At the same time, the number of CG students with a low level of foreign language proficiency decreased from 25% to 10%, while the percentage of students with a high level of foreign language proficiency increased by only 1.6 times.

Statistical hypotheses were tested through the Mann-Whitney U test (a criterion for detecting differences in the level of the studied feature for independent groups) at the level of significance  $p \leq 0.05$  (Table 4).

Given that the distribution quantile of the Mann-Whitney U test is 0.95 at two degrees of freedom, is 1100, less than the Mann-Whitney U test statistics, the null hypothesis  $H_0$  was rejected and the alternative statistical hypothesis  $H_1$  was accepted as plausible. All the above indicates that the process of development of students' foreign language competence in the course of application of simulation-based learning is higher than that of students who studied through the traditional method.

**Table 4.** Calculation of the Mann-Whitney U Test between CG and EG for the Level of Foreign Language Competence under the Conditions of Simulation-Based Learning

	Number of EG students	Number of CG students	Rank sum for EG	Rank sum for CG	Mann-Whitney U test	p
Levels of students' competence	72	70	5219	3367	1034	0.001

Source: Authors

## 5. Discussions

Foreign language training of students is a complex multifaceted process, where the effectiveness depends on many factors and conditions. The research and experimental work was conducted, indicators of evaluation of the effectiveness of the process of improving the foreign language training of students were analysed to test the research hypothesis. Educational and methodical materials of the research were developed for the purpose of functioning of the students training model with application of computer simulation-based learning technologies.

Chernikova et al. (2020) emphasized the need for widespread use of computer capabilities in the creation of educational simulations. The author believes that simulations of the translation process should be based on modern interactive learning platforms. The author notes the high efficiency of this teaching method. The authors note that their research did not reveal significant differences in student performance compared to the method of full immersion in the language environment. Such technologies can be used in the practice of professional training of specialists in various fields of higher education, in the system of retraining and advanced training. In particular, the method of simulations showed high efficiency during the training of future translators. According to studies by Bakhov et al. (2021) and Bewley et al. (2019), it is the simulation-based learning that allows students to immerse themselves in the language environment. This immersion does not require a visit to the country where the language being studied prevails. So, the maximum result is achieved with the minimal resources. Hussein (2021) and Jabu, Abduh and Rosmaladewi (2021) mentioned the method of simulations in their studies as the most effective method of developing professional competence. Plakhotniuk et al. (2021) and Tkach and Marusyk (2021) give great preference to simulation-based learning in comparison with other interactive methods. Bihych and Strilets (2020) see simulation-based learning as a universal technology of the future. Instead, studies by Hanyukov and Smolyanova (2020) show low efficiency of simulation-based learning compared to other methods.

The reliability and validity of the research results are ensured by the scientific argumentation of the initial theoretical positions, the adequacy of the methods used and the objectives of the study. The correctness of the experimental work, evaluation of the results of the experiment using mathematical statistics, a long enough experiment leaves no doubt about the objectivity of the study. The theoretical significance of the research results is that they expand and deepen knowledge about the essence of simulation in learning, its theoretical and methodological principles, organization with the use of computer technology. The proposed model of organization of students' simulation-based learning with the use of computer technology can be used in further research on ways to improve training and retraining. The practical significance of the study is the focus of its results on improving the training of future translators, the demand for the author's model, which allows increasing the effectiveness of training in the real educational process of high school.

The main limitations of the study are the difficulty of identifying the results of the study due to the limited sample of students. The difficulty is also in the development and use of modern multimedia technologies, the adequacy of the methods used to the research objectives, taking into account the needs of modern education. Due to the quarantine restrictions caused by the COVID-19 pandemic, it was difficult to test the research materials in the real educational process.

## 6. Conclusions

The main limitations of the study are the difficulty of identifying the results of the study due to the limited sample of students. The difficulty also lies in the development and use of modern multimedia technologies, the adequacy of the methods used for the task of research, taking into account the needs of modern education. It was difficult to test the research materials in the real educational process due to the quarantine imposed by the COVID-19 pandemic. The research topicality is determined by the problem of lack of qualified specialists who have a high level of foreign language proficiency and the ability to carry out effective professional foreign language communication. The results



of the experiment showed that the improvement of foreign language communicative competence of students can be achieved through professionalization of learning content, creating a professional and creative educational environment for foreign language training and development of self-learning skills in the course of foreign language training.

Simulation of real conditions and situations of translation activity is used in almost every lesson (80%) and promotes the development of future translators' professional competencies. During the final control in the experimental group it was found that all students have a high (48.10%) or medium (51.30%) level of foreign language proficiency, which confirms the effectiveness of the simulation method. In the experimental group, the percentage of students with a low level of foreign language proficiency decreased from 26.3% to 0.6% at the end of the study, and the percentage of students with a high level of foreign language proficiency increased almost 3 times. At the same time, the number of CG students with a low level of foreign language proficiency decreased from 25% to 10%, while the percentage of students with a high level of foreign language proficiency increased by only 1.6 times. Therefore, the hypothesis of this scientific study was confirmed experimentally. Simulation-based learning promotes the development of foreign language competencies in students majoring in Translation. The work has a broad theoretical and practical significance and can be used as material to improve the system of training student majoring in Pedagogy. Future research should be aimed at developing various competencies in future specialists. Particular attention should also be paid to the development of separate specialized competencies that are necessary for the training of specialists in various fields.

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## Appendix A

### Criteria and Indicators for Assessing the Effectiveness of the Process of Improving the Foreign Language Competence of Students Majoring in Translation

Criterion	Indicator
1. Motivational and target	<ul style="list-style-type: none"> <li>- focus on improving foreign language knowledge, skills, abilities;</li> <li>- ability to formulate goals and objectives in the field of improving foreign language communication skills;</li> <li>- the desire to work with foreign language specialized information sources;</li> <li>- the degree of focus on foreign language communication outside the requirements of the subject;</li> </ul>
2. Procedural and activity	<ul style="list-style-type: none"> <li>- ability to plan activities in the field of improving foreign language communication skills;</li> <li>- quality of processing and application of foreign language information;</li> <li>- integration of different types of acquired competencies in the course of improving foreign language communication;</li> <li>- originality and practical orientation of projects created during the study of a foreign language;</li> </ul>
3. Communicative and creative	<ul style="list-style-type: none"> <li>- level of communicative activity;</li> <li>- ability to make non-standard decisions when completing typical educational assignments;</li> <li>- aesthetics of design and presentation of foreign language creative projects;</li> <li>- knowledge and observance of historical, cultural and linguistic traditions in the course of foreign language communication;</li> </ul>
4. Performance and evaluative	<ul style="list-style-type: none"> <li>- adequacy of self-assessment and assessment of the quality completion of educational assignments;</li> <li>- the level of development of skills of self-control and mutual control of students;</li> <li>- indicators of intermediate certification (by topics and sections in their entirety);</li> <li>- mastery of professional terminology in an alternative linguistic system.</li> </ul>

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