Scientific article

IRISTI 16.31.41 **https://doi.org/10.55956/UMPC6884**

Zh.S. Karkimbayeva*
Master of Pedagogy and Psychology, Senior Lecturer
Dulaty University, Department «Foreign Philology and Translation Studies»
Taraz, Qazaqstan
K_zhannur@mail.ru

USING STEAM-PROJECTS TO INCREASE LINGUISTIC STUDENTS' INTEREST IN SCIENTIFIC RESEARCH

Abstract. *The article is devoted to the analysis of the impact of STEAM projects on the development of research motivation of students of linguistics in the context of modern digital education. The theoretical foundations of the design method, its connection with the system-activity approach and the potential of the STEAM paradigm combining scientific, technological, engineering, artistic and mathematical components are considered. During the pedagogical experiment, various types of STEAM projects were developed and implemented, including corpus research, machine translation analysis, and the creation of multimodal translation products. The results of surveys, observations, and analysis of student papers have shown that the STEAM approach increases interest in independent research, promotes the development of critical and creative thinking, strengthens the connection between theory and practice, and builds skills in working with digital tools. The data obtained confirms the effectiveness of STEAM projects in training future translators and linguists.*

Keywords: *STEAM approach, STEAM projects, research activities, pedagogical experiment, motivation, project-based learning, corpus linguistics, creativity, linguistic students.*

Introduction. Modern linguistic education is focused on developing students' research competencies, critical thinking, and the ability to work with digital data. However, research shows that the motivation of linguistics students to engage in independent scientific work remains insufficient in many universities. This is due to the dominance of theoretical training, a lack of practical focus in academic assignments, and the insufficient use of digital technologies.

One of the effective tools for increasing research interest is the STEAM approach, which combines scientific, technological, engineering, artistic and mathematical components into a single educational system. STEAM projects allow students to work with language data, digital platforms and visual models, combining research tasks with creative activities.

The modern education system is experiencing a period of intense digital and substantive change. Against the background of rapid technological progress and rethinking of the role of human sciences, the STEAM approach is becoming increasingly important, combining science (Science), technology (Technology), engineering (Engineering), art and humanities (Arts), as well as mathematics (Mathematics). Special attention in scientific discussions today is given to the component «A - Arts», which is considered as a key element that forms creative thinking, critical assessment of information, cultural competence and high communication skills - those qualities, which cannot be completely

replaced by automated systems or artificial intelligence. In this regard, there is an increasing need to update the methods and content of teaching a foreign language teaching at universities taking into account the demands of the 21st century, digitization processes and relevant interdisciplinary connections.

The methodological basis of modern educational standards is a systems-based, approach, focused on the formation of students' readiness for self-development, lifelong learning and active cognitive activity. This approach creates conditions for the inclusion of students in processes of independent search, analysis and application of knowledge.

The project method is considered as pedagogical technology, aimed at achieving educational goals through a practice-oriented solution of a given problem. It has a developing potential and is personality-oriented, promoting the development of research skills, creative thinking and responsibility for the results of their own activities.

The project method is not an innovation for the world pedagogical science. Early studies referred to it as the «problem method» and considered in the context of the humanistic educational philosophy formulated by John Dewey. One of the first systematic descriptions of this approach was presented by William Kilpatrick in his work "The Project Method" (1918), although elements of project activity had been used in pedagogical practice long before.

J. Dewey's ideas were that learning should be based on the active, purposeful activities of the student, focused on his individual interests and cognitive motives. According to his concept, the learner's personal involvement in solving practically significant tasks is a key condition for effective knowledge acquisition. In this regard, it is of particular importance to demonstrate to students the personal significance of the acquired knowledge and its practical value in everyday life. The effectiveness of learning is ensured through the formulation of a problem borrowed from real experience and having immediate significance for the child. To solve it, the student needs not only to apply existing knowledge, but also to master new ones that will have to be acquired in the course of educational activities. [1]

Design technologies relate to the educational technologies of the 21st century and are oriented towards the formation of students' ability to adapt effectively to the rapidly changing conditions of life in the post-industrial society. [2]

Project-based learning represents an instructional framework in which students gain knowledge and develop competencies by planning and carrying out practical assignments that become progressively more complex as their understanding depths. This method emphasizes sustained, independent learner activity - whether conducted individually, in pairs, or within groups - over a designated period. It also aligns naturally with collaborative forms of instruction. [3]

The purpose of project-based learning is to create conditions under which students can independently replenish missing knowledge from various sources, apply the acquired knowledge to solve both cognitive and practical problems, and develop communication skills.

During the course, students interact in various group settings (teams), developing research competencies that include problem identification, information gathering, observation and experimentation, and hypotheses generation and generalization. Project-based learning also promotes the

development of systems thinking, concentration, imagination, and memory. [4]

The technological element of STEM- and STEAM-education, ensuring the achievement of planned educational results, is project technology. The implementation of projects helps students to develop autonomy, creative and critical thinking, communicative competences, as well as - what is key for this work - research skills. [5]

A STEAM project is an educational or research project implemented as part of a STEAM approach that integrates five key components: Science (Science), Technology (Technology), Engineering (Engineering), Arts (arts and humanities) and Mathematics (Mathematics).

Key features of the STEAM project:

1. Integration of disciplines - the project combines knowledge and methods from different fields, contributing to the development of integrated thinking.
2. Problem-solving orientation - project tasks are taken from real life and require active search for ways to solve them.
3. Practical applicability - the project results have real value and can be presented in the form of models, visualizations, or tested in practice.
4. Creative component (Arts) - encompasses artistic and humanitarian elements, promotes the development of creativity, imagination and critical thinking.
5. Application technologies – involves the use of digital tools, modeling, data, analysis and multimedia resources.

The purpose of the article is to identify the impact of STEAM projects on the formation and increase of interest of linguistics students in independent scientific research.

Subject of study: educational process of training linguists and translators.

Object of the study: the impact of the STEAM project on motivation for independent research activities.

Hypothesis: the use of STEAM projects increases the motivation of linguistic students for independent research due to their interdisciplinary nature, practical focus, and creative component.

Motivation for research activity is formed under the influence of internal and external factors, such as interest in the discipline being studied, understanding of the professional significance of research, confidence in one's own abilities and the expectation of practical benefits from the results of work.

In practice, language students often face a number of difficulties:

- a lack of understanding of the connection between research and their future profession;
- fear of the complexity of research methods;
- a lack of illustrative examples of analytical and research work in translation and linguistics;
- low engagements in project forms of learning.

The STEAM approach helps overcome these barriers by combining technology, creative elements, and hands-on activities.

The potential of STEAM projects in the development of research motivation. In the context of language education, STEAM assumes the fulfillment of a number of practice-oriented tasks:

- working with text boxes (e.g., Sketch Engine, NLTK);
- using machine translation and subsequent post-editing;
- conducting statistical analysis of language errors;

- creating multimodal translation projects;
- visualization of linguistic data;
- using digital dictionaries, chat bots, and analytical platforms;
- development of small studies based on real texts, media content and information resources. [6]

This practice makes research tasks more understandable, accessible and meaningful, allowing students to observe the real results of their work, language students are offered the following methods:

- analysis of scientific literature;
- a questionnaire to determine the level of motivation for independent research activities;
- questionnaire to determine the level of motivation for independent research activities;
- pedagogical experiment with the implementation of STEAM projects;
- monitoring the learning and research process;
- analysis of students' performance results.

As part of the experiment, linguistic students were offered the following STEAM projects:

- Corpus study of linguistic phenomena.
- Machine translation quality analysis using computational metrics.
- Creation of a multimodal translation product – combination of translation, inphographics («Infographics» are a graphical way of presenting information) and visual design.

• A mini-engineering project to develop a glossary using digital tools.

• A creative translation project is the integration of an artistic component into translation work.

The STEAM project "Corpus study of linguistic phenomena" was integrated into the educational process. Let's take it apart:

Corpus research of language phenomena is when linguists study how people actually use language, using large sets of texts (corpus). For example, you can see how often a word or expression occurs, in which situations it is used, compare the texts of different genres or languages. For the work use special programs that quickly count words, find repetitive phrases and help to show results (for example, with graphs or tables). Simply put, it is like «the study of words and expressions in real speech or texts with the help of a computer». [7]

Conditions and methods of research. Students of 3rd courses, the educational program «Translation Studies» were offered mini-instructions on how to create their own corpus and research; students worked in mini-groups of 3-4 people and presented the results as part of a scientific student colloquium.

Research methods used:

• study of scientific and methodological literature;

• survey of students before and after completing projects;

• conducting a pedagogical experiment;

• observation of student work;

• analysis of projects, both in quantity and quality;

• comparison of changes in students' research skills.

Step 1. Text selection.

1. Define the purpose of the study (for example, analysis of the use of words or phrases in English and Russian).

2. Select the texts for the case:

• 50-100 short texts (news, articles, blogs, art texts).

• For bilingual analysis - texts and their translations.

Step 2. Create the case.

• Save the texts in an electronic format (for example, .txt).

• Group them by category (genre, language, text type).

• You can use free programs: AntConc, CorpusTool, Sketch, Engine (demo version).

Step 3. Search for linguistic units.

• Determine what you will analyze: a word, an expression, or a grammatical construction.

• Use the program to find all instances of the selected unit in the corpus.

• Record the frequency and context of use.

Step 4. Analysis.

• Compare the frequency and context of usage in different texts or languages.

• Analyze in which situations a particular structure is used.

• For parallel texts, compare the translation options and select the most suitable ones depending on the context.

Step 5. Visualization of the results.

• Build a frequency table.

• If desired, use graphs or diagrams to visually display the results.

Step 6. Conclusions.

• Identify patterns in the use of words and expressions.

• Draw conclusions about style, genre, or differences between languages.

• The results can be used for translation, writing articles, or improving language skills.

Let's take it apart:

Here is a ready-made example of a mini–corpus for analyzing the word «education», showing how the STEAM project corpus research helps in translation:

Mini-corpus example: analysis of the word «education»:

The purpose of the study: to study how the word "education" is used in English texts of different genres and how to choose the correct translation into Russian.

Step 1. Text selection.

- English corpus: 20 texts (news articles, research papers, blog posts).

- Russian corpus: translations of these texts or similar texts in Russian.

Step 2. Search the word.

Using the program AntConc we search all entries of the word «education»:

AntConc is free software for working with text boxes, which is used in linguistics and language learning. It allows you to analyze large sets of texts (bodies) and explore how words, expressions and grammatical structures are used in real texts.

Step 3. Context and frequency analysis. (Table 1)

Table 1

Context and frequency analysis

Text	Frequency	Context (example)	Possible translation
News	3	“Education is key to personal develop-ment”	Образо-вание является ключом к личност-ному развитию.
Scientific article	5	“Higher education institutions must adapt”	Высшие учебные заведения должны адаптиро-ваться.
The blog	2	“Online education offers flexibility”	Онлайн-обучение предос-тавляет гибкость

Conclusion: In different genres the word «education» is translated differently:

«education» is a common term;

«training» - when it comes to the process;

«study» or «online learning» - in informal texts.

• Context determines the choice of translation, which is especially important for professional translation.

Step 4. Visualization (optional).

• You can create a word frequency chart by genre.

• This helps you clearly see where and how a word appears most often and which translation is most suitable.

Step 5. Practical significance for translation.

• Students see real examples of the use of the word.

• You can choose the correct translation depending on the context and genre of the text.

• Skills of analysis, language comparison and adequate translation are developed.

Primary measurement of motivation showed that students are characterized by:

• Lack of confidence in one's own research abilities;

• Poor understanding of the connection between research work and future professional activities;

• Low initiative in choosing research topics.

Research results and discussion. *Qualitative results:*

• Increased the level of autonomy and responsibility of students;

• Increased propensity to choose topics related to translation technologies and corpus linguistics;

• The depth of analysis in scientific works has become significantly higher;

• The culture of research project design has improved;

• Students have demonstrated a willingness to participate in conferences and research competitions.

The results of the study and the discussion of the results showed that the STEAM approach really helps to increase the interest of linguistics students in scientific work. This is due to several reasons:

Firstly, STEAM projects integrate different fields of knowledge – language, digital technologies, mathematics, visual modeling, and creativity – making research more diverse and interesting for students.

Secondly, the use of digital platforms makes research work more accessible: students learn easier how to work with corpora, learn how to analyze large amounts of data and see how knowledge is applied in practice.

Thirdly, the creative component−for example, visualization, creation of multimedia products and creative translation − helps to engage students who usually find scientific work difficult and boring.

STEAM projects develop students' independence and demonstrate that research can be an engaging, technological, and creative process..

Conclusion. The study showed that the use of STEAM projects has a positive effect on the interest of linguistics students in scientific work.

The STEAM approach helps:

• increase the internal motivation of students;

• develop digital and research skills;

• develop analytical and creative thinking;

• improve the quality of independent research work;

• increase the involvement of students in the research process.

The results of the study confirm that it is advisable to continue to implement STEAM projects in linguistic educational programs.

References

1. Gajdenko E. Proektnaya deyatel'nost' uchashchihsya. Shagi v nauku - s 1-go klassa [Student Project Activities. Steps into Science - from 1st Grade] // Nachal'naya shkola [Primary School]. – 2006. – № 10. – S. 2; Stupnickaya M.A. Chto takoe uchebnyj proekt [What is an educational

project] // Pervoe sentyabrya [First of September], 2010. – 44 S. – URL: https://nsportal.ru/user/667/page/metod-proektov-istoriya-i-praktika-primeneniya
2. Chechel' I.D. Metod proektov ili popytka izbavit' uchitelya ot obyazannostej vseznayushchego orakula [The Project Method or an Attempt to Relieve the Teacher of the Duties of an All-Knowing Oracle] // Direktor shkoly [School Director]. – 1988. – №3. – S.8.
3. Sidenko A.S. Metod proektov: istoriya i praktika primeneniya [The Project Method: History and Practice of Application] // Zavuch. – 2003. – №3. – S.16.
4. Hutorskoj A.V. Sovremennaya didaktika: uchebnik dlya vuzov [Modern Didactics: Textbook for Universities] . – SPb: Piter, 2001. – S.12.
5. Kuz'mina Yu.A. Formirovanie issledovatel'skih umenij u mladshih shkol'nikov v usloviyah STEM-obrazovaniya: magisterskaya dissertaciya [Developing Research Skills in Primary School Students in the Context of STEM Education: Master's Thesis] / Tol'yatti, 2018. – 193 S. – URL: https://dspace.tltsu.ru/handle/123456789/8403
6. Semyonova M.B. Issledovatel'skaya rabota studentov v vuze: metodicheskie aspekty [Students' Research Work at the University: Methodological Aspects] / – SPb.: Piter, 2019. – S 224.
7. Martynova O.V. STEAM - obrazovanie kak faktor razvitiya issledovatel'skih Navykov [STEAM education as a factor in the development of research skills] // Innovacii v obrazovanii [Innovations in Education]. – 2021. – №2. – S. 14–22.
8. Fedorova N.N. Cifrovye resursy v lingvisticheskom obrazovanii. [Digital Resources in Linguistic Education] – SPb.: BHV– Peterburg, 2022.
9. Berezhnova E. V. Proektnaya deyatel'nost' v obuchenii lingvistov. [Project Activities in the Training of Linguists] – M.: Akademiya, 2021.
10. Selivanova E.A. Sovremennye metody lingvisticheskogo analiza. [Modern Methods of Linguistic Analysis] – M.: YUrajt, 2019.
11. Martynova I.A. Razvitie issledovatel'skoj kompetencii studentov gumanitarnyh special'nostej [Developing Research Competence of Students Majoring in the Humanities] // Vestnik pedagogiki [Bulletin of Pedagogy], – 2020.

Ж.С. Каркимбаева

М.Х. Дулати атындағы Тараз университеті, Тараз, Қазақстан

СТУДЕНТТЕРДІҢ ҒЫЛЫМИ ЗЕРТТЕУЛЕРГЕ ҚЫЗЫҒУШЫЛЫҒЫН АРТТЫРУ ҮШІН STEAM-ЖОБАЛАРЫН ПАЙДАЛАНУ

Аңдатпа. *Мақала заманауи цифрлық білім беру жағдайында лингвист студенттердің зерттеу мотивациясын дамытуға STEAM-жобаларының әсерін талдауға арналған. Жобалық әдістің теориялық негіздері, оның жүйелік-белсенділік тәсілімен байланысы және ғылыми, технологиялық, инженерлік, көркемдік және математикалық компоненттерді біріктіретін steam парадигмасының әлеуеті қарастырылады. Педагогикалық эксперимент барысында STEAM-жобалардың әртүрлі түрлері әзірленді және енгізілді, соның ішінде корпусты зерттеу, машиналық аударманы талдау және мультимодальды аударма өнімдерін жасау. Сауалнамалар, бақылаулар және студенттік жұмыстарды талдау нәтижелері STEAM тәсілі өзін-өзі зерттеуге деген қызығушылықты арттыратынын, сыни және шығармашылық ойлауды дамытуға ықпал ететінін, теорияның практикамен байланысын күшейтетінін және цифрлық құралдармен жұмыс істеу дағдыларын қалыптастыратынын көрсетті. Нәтижелер болашақ аудармашылар мен лингвистерді дайындаудағы STEAM жобаларының тиімділігін растайды.*

Тірек сөздер: *STEAM-тәсіл, STEAM-жобалар, зерттеу қызметі, педагогикалық эксперимент, мотивация, жобалық оқыту, корпус лингвистикасы, шығармашылық, лингвист студенттер.*

Ж.С. Каркимбаева

Таразский Университет им М.Х. Дулати, Тараз, Казахстан

ИСПОЛЬЗОВАНИЕ STEAM-ПРОЕКТОВ ДЛЯ ПОВЫШЕНИЯ ИНТЕРЕСА СТУДЕНТОВ К НАУЧНЫМ ИССЛЕДОВАНИЯМ

Аннотация. *Статья посвящена анализу влияния STEAM-проектов на развитие исследовательской мотивации студентов-лингвистов в условиях современного цифрового образования. Рассматриваются теоретические основы проектного метода, его связь с системно-деятельностным подходом и потенциал STEAM-парадигмы, объединяющей научные, технологические, инженерные, художественные и математические компоненты. В ходе педагогического эксперимента были разработаны и внедрены различные виды STEAM-проектов, включая корпусное исследование, анализ машинного перевода и создание мультимодальных переводческих продуктов. Результаты опросов, наблюдений и анализа студенческих работ показали, что STEAM-подход повышает интерес к самостоятельным исследованиям, способствует развитию критического и творческого мышления, усиливает связь теории с практикой и формирует навыки работы с цифровыми инструментами. Полученные данные подтверждают эффективность STEAM-проектов в подготовке будущих переводчиков и лингвистов.*

Ключевые слова: *STEAM-подход, STEAM-проекты, исследовательская деятельность, педагогический эксперимент, мотивация, проектное обучение, корпусная лингвистика, креативность, студенты-лингвисты.*

Received 25.11.2025
Accepted for publication 6.01.2026

Cite the article: