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APPROACHES TO LEARNING ECONOMIC TERMINOLOGY THROUGH CORPUS RESEARCH AND DIGITAL EXERCISES

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ABSTRACT
This article addresses several key aspects of a recent project on the digitization of lexical resources with economic terminology—extraction, compilation, and creation of a core corpus and ten specific topical areas, software processing, creation of interactive exercises, and testing the efficiency of the learning curve in both native and foreign learners of Bulgarian and English.
We used Sketch Engine for the selection, analysis of the semantic relations, behavior of lexemes, terminology database, word forms, collocations, and concordances. The bespoke corpus provided a current linguistic view of the use of economic lexemes in contemporary economic research consisting of doctoral theses, articles, and textbooks in Bulgarian and English. In the next stage, we created interactive exercises and tested their efficiency during independent learning of vocabulary items (both Bulgarian and English) in specific target groups of students – foreign students learning Bulgarian as a second language, or Bulgarian students of economics enrolled in a Business English course. As an empirical experiment, we tested the hypothesis of whether encyclopedic knowledge of economic terms acquired through definitions and examples from textbooks can be complemented, and even surpassed, by a learning approach that explains terminology in a more engaging and lively reiteration of similar content selected from representative corpora.
This project offers a substantial database of lexical terms, uniting both current corpus research and didactic approaches to the acquisition of fundamental vocabulary across economic disciplines.

Keywords: economic terms, corpora, digitalization, effectiveness of learning

INTRODUCTION TO THE LEXICOGRAPHIC DATABASES USED

When we talk about electronic lexical resources, we often reduce compilation to digitizing and organizing content in a user-friendly format. The work of selecting (automatically or manually) the terminology, adding definitions, and carefully screening lexemes in terms of their relevance, scientific significance, belonging to a specific culture (economic or national, even supranational), and usability determine the importance and relevance of each term in everyday practice and in the assimilation of the terminology of the social sciences. In the digitization of an already existing corpus such as the multilingual dictionary previously compiled by the same department in 2013 [1], which we have updated, upgraded, and supplemented, it is not so much the definitions that are essential, but rather the translation equivalents in the five languages (English, German, French, Russian, and Latin) that set the linguistic picture of multilingualism in the economic sphere. Due to the nature of the Latin and Ancient Greek roots, their etymologies remained uncorrected, and

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thanks to them, the Indo-European context of word formation and translation of terms into Bulgarian was illustrated. The advantage and contribution of the multilingual resource was due to the comprehensive and in-depth understanding of the existing links at the lexical, morphological, and semantic levels, which were expressed and emphasized in the course of the work with the help of digital tools. Such a resource is a reference tool, but it is also valued in the traditional sense of a lexicographical resource by students, for whom it has served as a teaching aid.

Another type of lexicographical material is contemporary corpus resources, which in the field of economics are grouped as thematic lexical and semantic networks, e.g. BabelNet, WordNet, Wiktionary, offering multilingual lexical content, EuroTermBank, IATE (Interactive Terminology for Europe) with reliable multidisciplinary terminology databases with an interactive interface and rich terminological information about the EU. They were also successfully used in the selection of terminology lists and in updating the multilingual terminology glossary for the project.

To build the digital lexicographic resources, we compiled a corpus of scientific research in Bulgarian and English and used SketchEngine as a lexicographic platform for creating the corpus. Based on the options for extracting terms, we manually processed the specific sample. On the Moodle page of the interactive terminology dictionary, we have attached tables with the basic and processed lexemes, sorted by frequency and relevance to economic topics. The categorization of the lexemes allowed us to organize them for the purposes of the experiment into two sub-resources – basic terms and thematic areas, differing in the style and nature of the definitions added to them in order to determine which of the two types of resources would be characterized as more successful, more accessible, and more useful. We also referred to Multi-SimLex as a source of methodology for creating semantic lexical resources in several stages with application in economic disciplines. The finished resources were tested by students (156 in total), a small number of whom completed the subsequent feedback questionnaire on the project page in Moodle.

In the course of our work, the following main advantages of corpus resources in our case stood out:

- wide coverage and multilingualism
- interactivity and user engagement
- adaptation to the specifics of economic disciplines
- the possibility of more visible highlighting and easier finding of equivalents and relationships not only at the semantic level, but also in a multidisciplinary aspect
- visible improvement in language skills and motivation to learn vocabulary in Bulgarian and English (and possibly other languages, depending on the specific case)

The corpus resources on the global network are currently vast in volume. For example, BabelNet covers 600 languages and 23 million synonym groups, creating references and "bridges" between terms in the economic and social sciences. SketchEngine, which we used to compile our corpus, is used by all leading lexicographical institutions worldwide, by hundreds of thousands of lexicographers and linguistic teams, and by ordinary learners of different languages. Its convenient and intuitive interface allows for the analysis of lexical relationships, semantic networks, the contexts of terminological lexemes in different languages, the collocations they form, their frequency of use, and many other aspects and linguistic functions that are of priority to students and researchers interested in corpus linguistics. To legitimize our research, the platform itself offered us interesting opportunities to analyze the behavior of lemmas, their combination in texts of different styles and topics from current economic sources in Bulgarian, and the opportunity to compare them with the behavior of their equivalents in English in a larger database from the corpora used in the platform.

Our research found that digital and interactive resources engage attention better and lead to improved language skills, knowledge, and increased motivation to learn, which we discussed in a previous project by the department [2]. The

inclusion of tasks, gamification, and digital platforms containing interactive elements stimulates the playful behavior needed for more unhindered and active manipulation of content, the ability to independently manage the learning process, and a departure from the rigidity of mandatory language teaching models. The very fact that motivation increases when the learning process is understood not only rationally but also emotionally, always with a palette of unconscious sensations, leads to the need to reduce interaction from stimulating a reaction to the familiar or the new to surprising communicative strategies for learners. We achieve this departure from the coherent framework in our research by testing the learners' reactions, their willingness to make a conscious effort and to independently build on their learning process according to their own plan through the multi-variant forms of encyclopedic dictionary resources.[3]

Bulgarian corpus databases are mainly linked to BulNet (the Bulgarian version of WordNet), which has a rich lexical-semantic network with a system of synonyms (SYNSETs), including over 85,000 units at the beginning of 2020. [4] Access to the platform is interactive, allowing navigation through semantic relations (genus–species, part–whole, interlingual equivalents). In teaching economics, it is used for exercises such as "finding a synonym/hyponym," checking precise meanings and semantic deviations, all of which are possible with the functions of the corpus platform. In addition, the "Lexical Database" portal (Institute for the Bulgarian Language) has a thematic dictionary of economics, created through the analysis of economic corpora, composed of lemmas with definitions and grammatical characteristics. It is convenient for tracking the use of terms and comparing variability in different contexts (lectures, textbooks, business communication). Another project: "Terminological Practice" (2016–2018) with a subproject "Terminological Dictionary of Economics" [5] develops an electronic terminology database with definitions, encyclopedic explanations, grammatical information, and semantic structures, relying on approaches from onomasiology, semasiology, and cognitive terminography, combined with an IT interface for interactive processing. During the construction of BulNet, the selection of synsets was based on frequency analysis of large corpora using basic forms (lemmas), which ensures the representativeness of economic terminology and relevance in real text contexts. The electronic economic database of the IBE is based on the explication and extraction of terms from corpora, including economic reports, textbooks, and statistical analyses. The approach combines onomasiological (term → concept), semasiological (concept → lexeme), and corpus analysis [6].

Bulgarian academic practice (IBL) shows that applying BulNet and the National Corpus to language tasks encourages research skills, independent work, and interest in terminology in the learning environment [6, idem]. These methods build research skills, encourage independent work, and form a critical approach to terminology. Common university practices aimed at more effective learning include the use of dictionaries in the analysis of economic texts, the definition and categorization of terms through structured lexical tasks, and the construction of thematic networks (network mapping) for economic terms.

The advantages of using corpus resources are numerous, including:

- Structured semantic navigation: BulNet allows for predefined navigation: related concepts, hyponymy/hypernymy, and scientific labels, which helps learners form conceptual networks.
- Interactive access and active use: The use of electronic databases allows for searching, filtering, and entering into textual context, which improves independent work and expands in-depth understanding of the terminology.
- Updates and domain specificity: IBE projects are updated with new terms and corpora, ensuring that the economic lexicon remains current.

Considering that the technical design of the databases is well structured, their interface remains mainly textual and lexicographical—there is no visualization or dynamic search. However, their methodological potential has been proven [6, idem]: BulNet and corpus tasks stimulate analysis, research skills, and academic

reflection, while corpus analysis provides empirical justification for the included terminology and its frequency in real use. With a view to their development, visually enhanced modules (graphics, network maps, interactive visualizations of terms) can be added, exercises can be integrated, APIs for the development of application materials and gamified elements can be developed, and controlled experiments (e.g., comparison: traditional dictionary vs. interactive resource) to measure the effectiveness of terminology acquisition. The same recommendations apply equally to our research, which, although significantly more modest in concept and form, presents a language teaching resource with multiple uses and opportunities for improvement in the Moodle platform and beyond.

Scope and objectives of interactive learning through digital resources for the current project

The **tasks** we set for ourselves addressed how the resource affects performance, motivation, engagement, autonomous learning, its use as a supplement to traditional course vocabulary resources, knowledge of electronic corpora, and their use for the purposes of foreign language teaching and teaching of core subjects. We also looked for evidence of the possibility of organizing the learning process around individual and group use of the resource and whether this would lead to greater effectiveness of the materials, better coverage of topics and sub-sections of lexical terminology areas, and their assimilation at the language level. For the purposes of the project, the training was organized for full-time and part-time economics students and students participating in off-site training within one week per semester, who can use the resource throughout their studies. The **materials** we used comprised: Moodle, online resources and glossaries, processed lexicographic resources, Sketch Engine. The training **aimed** to stimulate students' interest in learning basic economic terminology in Bulgarian and English; to supplement lecture courses with entertaining resources that facilitate the learning of the material; to create lasting habits for independent learning and monitoring progress during the course of study; to test the effectiveness of digital resources used as an additional element in language teaching; to test the usefulness of the interactive options set as a goal in the implementation of the project; to identify the advantages and disadvantages of the online platform in the context of other educational resources; to determine the usefulness of electronic resources in Bulgarian language training for foreigners and in teaching terminology to economics students (Bulgarians); to summarize knowledge through a game-based and interactive approach suitable for both group and individual learning.

Survey methodology

The main questions asked in the study of the effectiveness of electronic resources covered:

- Demographic data
- Field of study and course of study
- Self-assessment of personal needs for learning basic terminology through online resources
- Before (personal assessment of the level of terminology literacy, use of textbooks, dictionaries, glossaries, and notes from lectures and exercises) and during the course (for consultation, preparation, revision)
- After completing work with the resource (durability of knowledge, usefulness of the resource, success)[1]
- Content of the resource: open answer

Results of the feedback survey and discussion

We added the following feedback survey to the interactive dictionary page, which was not mandatory, but nevertheless gave us an idea of the students' opinions:

The questions (12 in total) were aimed at assessing the effectiveness of three educational resources ("Basic Terms and Flashcards," "Thematic Areas," and "Multilingual Terminology Dictionary") in Moodle, used for learning economic terminology.

The first two questions in the survey are mainly demographic in nature and aim to position the respondents by major and course of study in the Faculty of Economics **(Figure 1).**

[1] Due to the voluntary nature of collecting survey responses, we decided to restructure the survey from an input-output survey to a feedback survey in order to improve the resource.

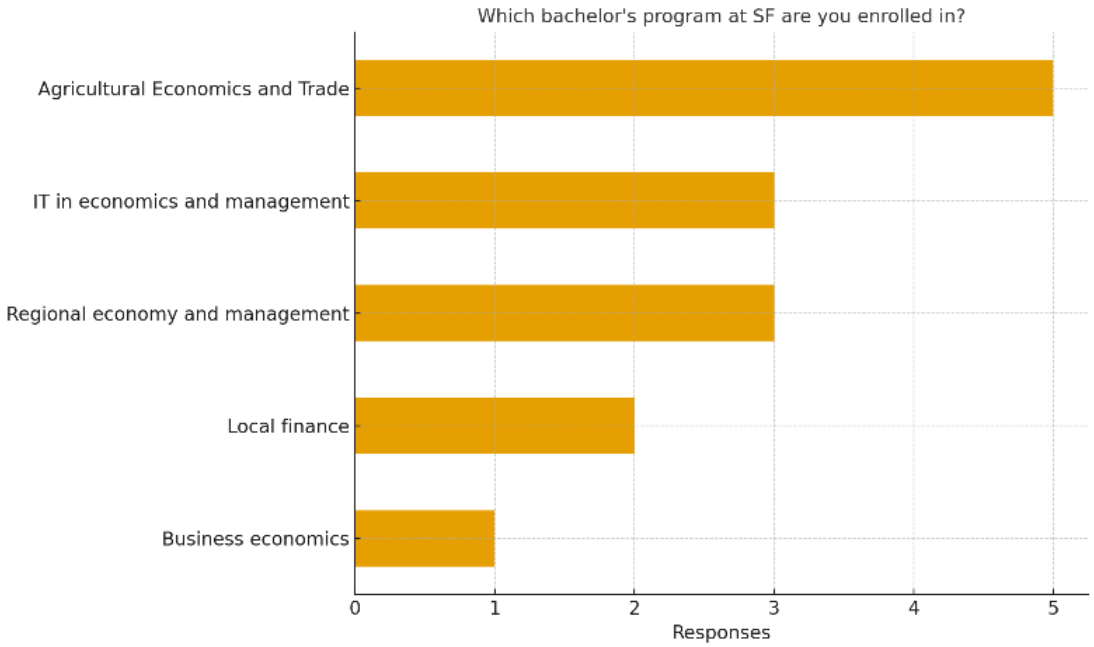

Figure 1. Degree program

Most respondents study agricultural economics and trade (35.7%), followed by regional economics and management (21.4%) and IT in economics and management, with local finance represented by 14.3% and business economics by 7.1%. First-year students represent 64.3% of the total number, second-year students represent 28.6%, and third-year students represent 7% **(Figure 2).**

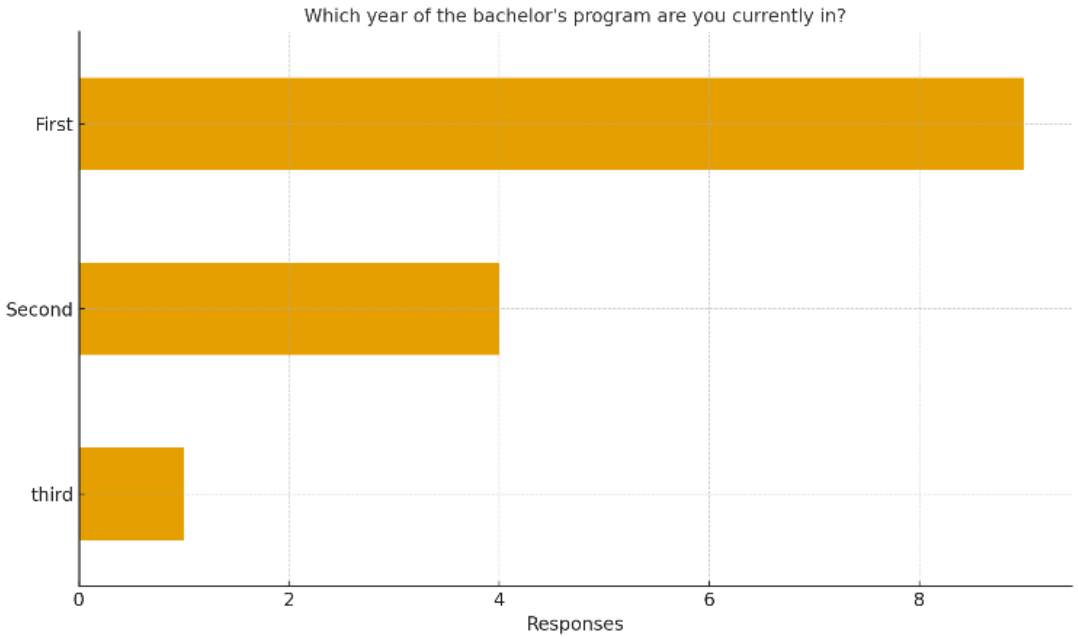

Figure 2. Year of study

The next question addresses some options for accessing information resources as a common way to look up or learn terminology. The sub-options of the answers show that most students

rely on lecture materials and aids (71.4%), which is indicative of the current form of teaching at the Faculty of Economics. The next most reliable source is textbooks, books, and scientific literature (64.3%), which still constitute a significant form of economic knowledge in terms of volume and information. One of the respondents added YouTube as a specific source of information, so we decided to validate their choice by adding a sub-variant to the possible answers. It's interesting to see the percentage of respondents who use multimedia materials (57.1%) and artificial intelligence (35.7%) to check and access educational information. We assume that generational differences (we deliberately did not include age as a demographic criterion in order not to discriminate against the study contingent) also contribute to this significant use of modern means of communication in learning. The probability that artificial intelligence will be the predominant source of information and encyclopedic knowledge in the near future is therefore quite high. When we were preparing the draft of the project, artificial intelligence applications were not yet so widely popular. Just two years after the start of the project, the situation is completely different. The use of applications as a dictionary and encyclopedic resource provides free access in a very short time to virtually unlimited information on any topic, even specialized ones. Five of the respondents indicated that they used AI for their terminology learning. This puts the research in a new context and also in a new perspective for subsequent work on the creativity of teachers and learners and the need for increased critical thinking and responsibility in the learning process. The ethical side of technological advantage is now quite unclear due to its widespread use, but the challenge of disarming (exposing) Goliath in an unequal battle still generates an impulse for new discoveries.

The rationale for setting the target language as an option for learning terminological vocabulary stems from the intention to use the dictionary in the teaching of students who are learning Bulgarian as a second language. There is a growing number of studies on the place of corpus dictionary resources in foreign language teaching, which focus on the realistic, authentic use of terms in the context of huge databases. And while Bulgarian is considered a small language in terms of corpus databases, the fact that the number of students who have chosen to develop both their first and second languages is equal is indicative of the need for and relevance of such tools at the micro level. **(Figure 3)**

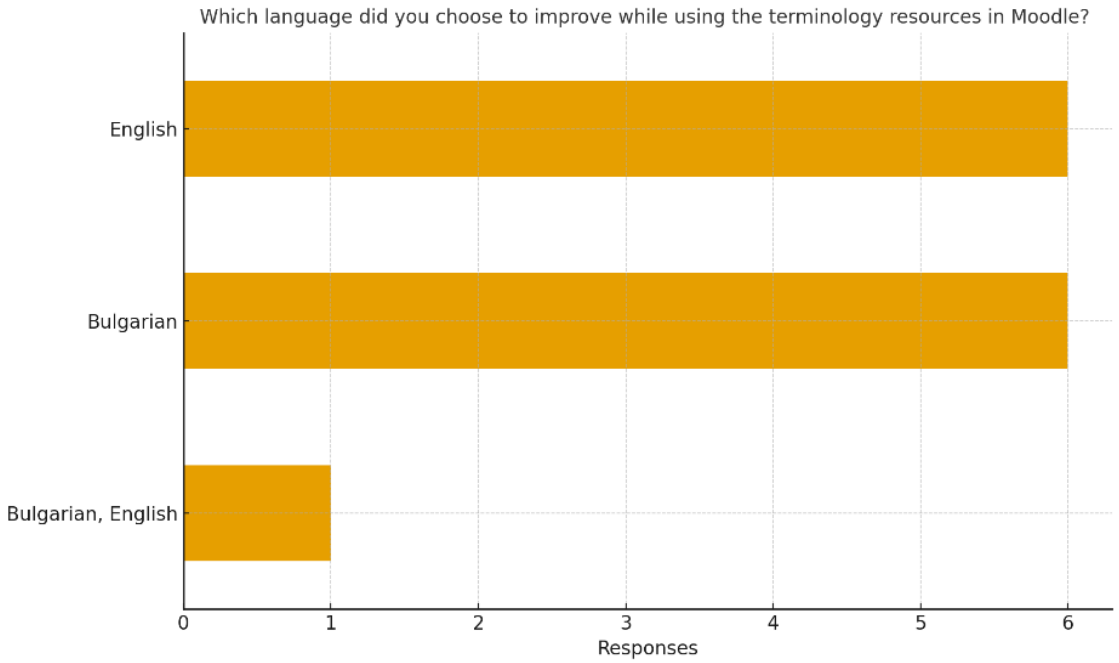

Figure 3. Target language

When using the resources, the organization of the content proved to be a distinct advantage (57.1%), followed by easy visualization (42.9%), the possibility of learning the term in several languages (42.9%), the use of the definition in English (35.7%), flashcards with interactive content (35.7%), and the ability to compare different types of dictionaries (14.3%). The above results show an overlap with the initial guidelines for compiling the dictionary—that the digitized content should be informative, referential, and diverse. For the most part, students reported similar advantages, which shows that the resources are easy and straightforward to use.

With regard to resource weaknesses, the most notable shortcoming appears to be the lack of illustrative material. Due to certain technical features of the applications in Moodle, we have limited the visualization of terms in terms of volume. Therefore, the definitions of the thematic areas contain fewer examples and illustrative elements, and the basic terms and multilingual dictionary have a very limited number of example sentences. Since the project is open to improvements over time, we hope to compensate for this loss of information.

An interesting comparison between the different resources in terms of their ease and pleasure of learning shows that the basic terms (57.1%) and the multilingual terminology dictionary (57.1%) are equally popular, while the subject areas are preferred by 35.7% **(Figure 4).** A possible interpretation of these levels is related to some extent to the conciseness of the definitions in the two dictionaries and their academic nature. The more popular style of explaining terms by subject areas is probably somewhat engaging, but not sufficiently reliable for economics students, despite the comprehensive explanations. Another interpretation is also possible—the thematic areas were not entirely interactive—students could read the definitions and translation equivalents, make the relevant references, but did not have such an intriguing interactive game to practice them with. Flashcards obviously work better with a smaller number of lexemes and more concise definitions than with the more comprehensive encyclopedic and popular science nature of the definitions in the thematic areas resource.

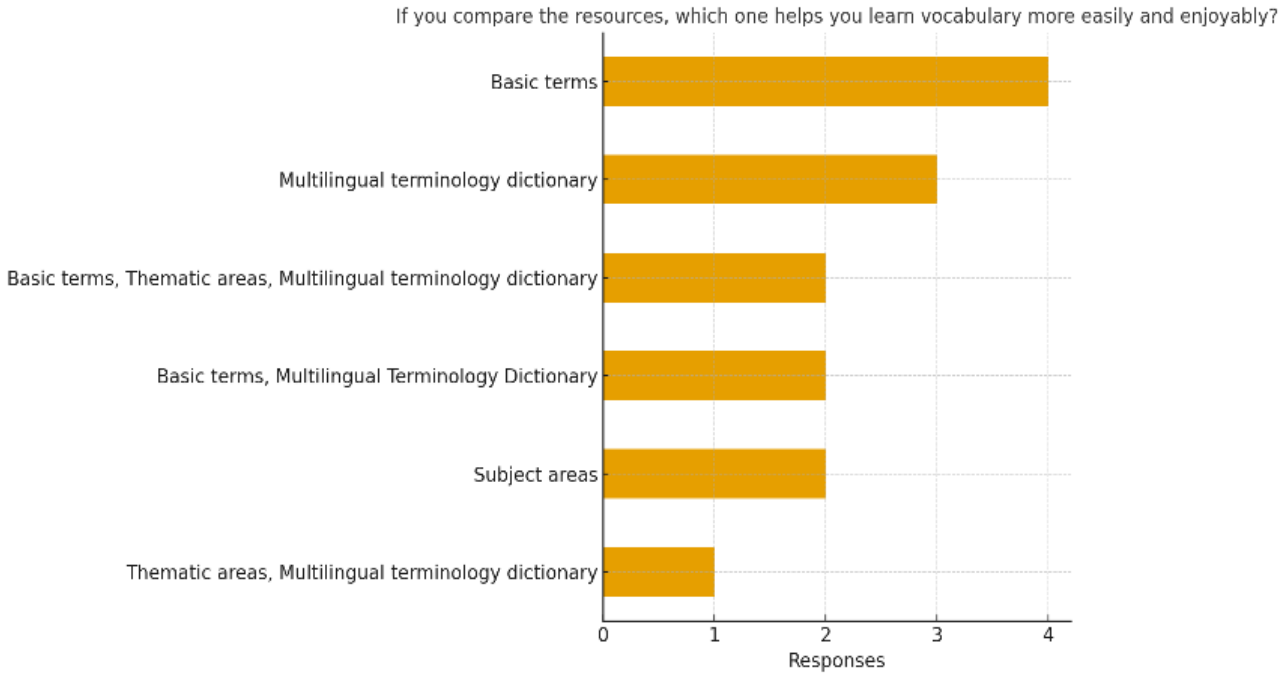

Figure 4. Preferences by ease and enjoyability

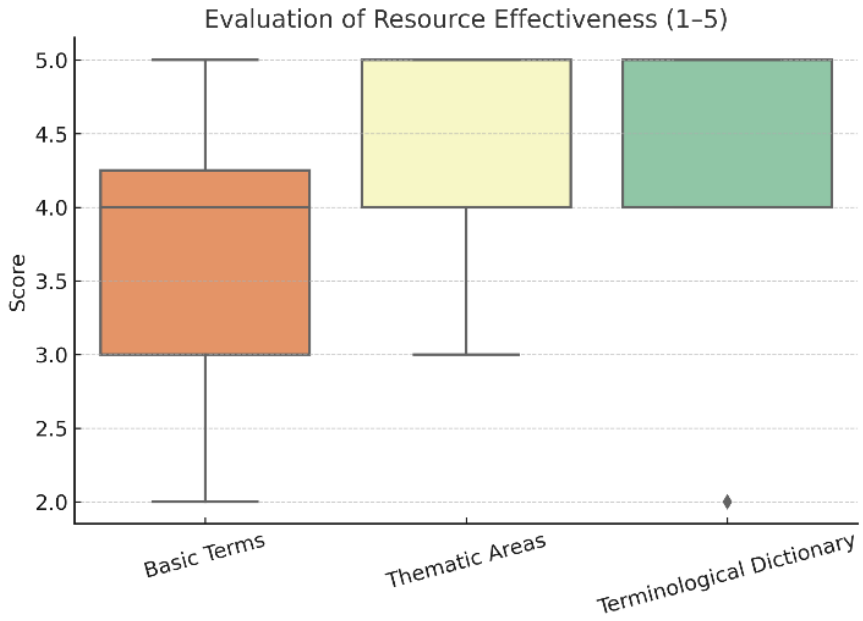

Figure 5. Effectiveness of the educational resources

Table 1. *Statistical analysis of the resource effectiveness*

Resource	Average rating	Standard deviation	Min.	Max
Basic terms and flashcards	3.93	0.92	2	5
Thematic areas	4.07	0.92	2	5
Multilingual terminology dictionary	4.14	1.03	2	5

As a resource, the multilingual terminology dictionary is rated highest, albeit with greater dispersion in opinions **(Figure 5 and Table 1)**. The dependencies between the other resources show that there are fluctuations in preferences and that there is some approval of some of their advantages, which remain in the background behind the factors of "comprehensiveness" and "multilingualism" that characterize the highest-rated resource. The hypothesis that popular or academic presentation of information is more easily absorbed is confirmed in view of the requirements of the subject matter (academicism) as more valuable. The characterization of different teaching styles as successful or not in this case cannot be completely defined as definitive, since the differences are too individual and the criteria set correlate closely. It is also important to note the smaller range of respondents, which in this case is a factor of the sample rather than the entire group.

The questionnaire was a shortened version of the initial, more detailed research methodology, which included an entrance test and an exit test for participants, but for various practical reasons, we decided to reformulate the criteria into voluntary opinions on the effectiveness of the resource. Due to the optional nature of the

survey, we did not receive the expected number of responses, but we were able to draw valuable lessons for improving the resource from those students for whom it represented an interesting interactive learning format.

Additional scientific results achieved included the creation of an authentic corpus of terms, extracted using lexicographic software and processed manually, which formed the basis of the three dictionary resources used as experimental in the study. When testing the resources, we found interesting correlations between the stylistic specifics of the definitions and the students' preferences for a particular type of economic information. Contrary to expectations that most of the respondents would choose the popular science style of the thematic areas from the second language resource as more accessible and effective for learning, it turned out that **the most reliable and trusted resources were the updated multilingual terminology dictionary, followed closely by the resource with interactive flashcards of basic terms**. This confirmed the assumption about the (still) significant inertia of the strict academic approach with which economics is perceived as a social science.

In terms of the effectiveness of the resources, most respondents found that the independence and interactivity of the resources contribute to a more enjoyable way of learning or reviewing the terminology presented in the educational content of the economic disciplines at the Faculty of Economics, which also leads to the expansion of their language skills, perceptions, and knowledge.

CONCLUSIONS

In conclusion, based on the survey, we found that there has been both a qualitative and quantitative change in the knowledge of economics students, in terms of the effectiveness of the online lexicographical resource. By using the resource, we have enriched the pedagogical tools and materials available to students at the Faculty of Economics. We have identified and continue to explore the strengths and weaknesses of adding the resource to classroom, hybrid, and autonomous learning, as well as the benefits of the interactive nature of online resources.

The main objective was to study the effectiveness of foreign language learning through corpus-based electronic dictionaries and interactive resources. The volume and composition of the glossaries were examined in advance by specialists – economists. Through the implementation of the set goal, the economic disciplines studied at the Faculty of Economics were presented as separate thematically oriented language corpora with an increasing degree of difficulty to improve the level of the students. During the research carried out in this project, by supplementing the dictionary corpora with the etymology of the Bulgarian term, word combinations, collocations with examples and visual resources, conclusions were drawn about the effectiveness of interactive methods with digital resources for improving students' language skills.

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