

INTEGRANDO O COMPONENTE LINGUO-CULTURAL E O MÉTODO DO MAPA DA MENTE PARA DESENVOLVER UM E-DICIONÁRIO TRILÍNGUE DE TERMOS BIOLÓGICOS

INTEGRATING THE LINGUOCULTURAL COMPONENT AND MIND-MAP METHOD TO DEVELOP A TRILINGUAL E-DICTIONARY OF BIOLOGICAL TERMS

KALIZHANOVA, Anna^{1*}; MARYSHKINA, Taissiya²; ISHMURATOVA, Margarita³; IBRAYEVA, Bayan⁴; SEMBIYEV, Kurmangazy⁵;

^{1,2}Department of Foreign Languages and Intercultural Communication of the Private Institution, Bolashaq Academy

³Department of Botany of Karaganda State University named after E.A. Buketov

⁴Department of Foreign Languages and Intercultural Communication of Bolashaq Academy

⁵Department of Kazakh Language and Literature of Bolashaq Academy

* Corresponding author
e-mail: kalizhanova.bsu@bk.ru

Received 02 December 2019; received in revised form 06 February 2020; accepted 14 March 2020

RESUMO

O projeto nacional *Trinity of Languages* anunciado no Cazaquistão promoveu a educação multilíngue em todo o país. O projeto requer a implementação de ferramentas rigorosas de aprendizado para dominar os idiomas cazaque, russo e inglês no trilinguismo. Um dicionário eletrônico para ser usado no aprendizado integrado de conteúdo e idioma está entre as modernas ferramentas eletrônicas promovidas em um ambiente escolar trilingue. Um dicionário eletrônico biológico fácil de usar ajudará os alunos do ensino médio a compreender conceitos básicos nas ciências naturais. O artigo tem como objetivo descrever como analisar e sistematizar o material lexicográfico selecionado para o desenvolvimento de um dicionário eletrônico trilingue de termos biológicos para os alunos das escolas do Cazaquistão. A determinação das fontes do vocabulário selecionado foi baseada em uma abordagem línguo-cultural, que destaca o aspecto cultural incorporado na língua, e o mapeamento mental, que permite desconstruir graficamente tópicos complexos. Vinte e oito itens foram selecionados para cobrir o curso da escola de biologia, que foram posteriormente analisados e sistematizados para apresentar consistentemente características genéricas e de espécies através do mapeamento mental. Em seguida, a unificação orgânica dos itens e os parâmetros de composição do e-dicionário foram determinados. As descobertas obtidas mostraram que um componente linguístico é incorporado em um dicionário eletrônico trilingue de termos biológicos, retirados dos livros didáticos relevantes das escolas cazaque e russa (notas 6 a 11). Os itens selecionados são classificados e sujeitos à análise línguo-cultural em grupos conceituais que podem mostrar *phytonyms* e *zoonima*. Os itens são fornecidos com um comentário linguístico-cultural adequado, retirado de livros e sites de referência em inglês. Os grupos conceituais e comentários linguísticos são exibidos no mapa mental *Coggle* usado para a formação de quadros do dicionário eletrônico. O componente línguo-cultural proposto incorporado no dicionário eletrônico é raro em outros dicionários eletrônicos trilingues existentes, pois se concentra principalmente no material lexicográfico e em sua representação visual. No geral, o dicionário eletrônico trilingue criado no software de mapeamento mental é uma ferramenta eletrônica eficaz para os alunos do ensino médio estudarem termos biológicos com seus comentários linguísticos.

Palavras-chave: trilingüismo; e-dicionário; unidades lexicográficas; componente línguo-cultural; mapa mental.

ABSTRACT

The national project *Trinity of Languages* announced in Kazakhstan has brought forward multilingual education throughout the country. The project requires the implementation of rigorous learning tools to master the Kazakh, Russian and English languages within trilingualism. An e-dictionary to be used in content and language integrated learning is among modern e-tools promoted in a trilingual school environment. A user-friendly biological e-dictionary will help high school learners grasp fundamental concepts in natural sciences. The article aims to describe how to analyze and systemize the lexicographic material selected for developing a trilingual e-dictionary

of biological terms for Kazakhstani school learners. Determining sources of vocabulary chosen was based upon a linguocultural approach, which highlights the cultural aspect embodied in the language, and mind-mapping, which allows deconstructing complex topics graphically. Twenty-eight items were selected to cover the biology school course, which was later analyzed and systemized to consistently present generic and species features via mind-mapping. Then organic unification of the items and compositional parameters of the e-dictionary were determined. The obtained findings show that a linguocultural component is embedded in a trilingual e-dictionary of biological terms that are taken from relevant Kazakh and Russian school textbooks (grades 6–11). The selected items are classified and subject to linguocultural analysis in conceptual groups which may show phytonyms and zoonima. The items are supplied with an adequate linguocultural commentary taken from English-language reference books and websites. The conceptual groups and linguistic analysis are displayed via the mind map *Coggle* used for the e-dictionary frame formation. The proposed linguocultural component embedded in the e-dictionary is rare in other existing trilingual e-dictionaries since they focus primarily on lexicographic material and their visual representation. Overall, the trilingual e-dictionary created in mind-mapping software is an effective e-tool for high school learners to study biological terms with their linguocultural commentaries.

Keywords: *trilingualism; e-dictionary; lexicographic units; linguocultural component; mind map*

1. INTRODUCTION:

The Republic of Kazakhstan announced the national project called the Trinity of Languages in 2006 (Chukenayeva *et al.*, 2016). This project introduced a new tier of secondary and higher educational institutions, including the Nazarbayev Intellectual Schools and Nazarbayev University. Since then, the project has become the basis of multilingual education in Kazakhstan (Kosybaeva *et al.*, 2017), which means a large-scale introduction of trilingualism throughout the country. In particular, Kazakh is designated as the official language, Russian functions as the language of intercultural communication, and English is selected as the language of business.

This idea supports the government's activities to ensure industrialization and sustainable economic growth revealed in the 100 Concrete Steps to Implement Five Institutional Reforms document published in 2015 ("President Nazarbayev unveils ...", 2015). Since then implementation of this Plan of Nation has been demonstrating a steady increase in industrial production, mining and quarrying, manufacturing, and agriculture. The volume of transportation and communication services, retail and wholesale trade has also risen (State programs, 2018). In the era of globalization, foreign investment brings about technology development and subsequent industrial restructuring, which enable to improve economic output (Dave, 2007; Vanderhill *et al.*, 2019). Hence, people must have a good command of the Kazakh, Russian and English languages to be fully involved in activities boosting industrialization and sustainable economic growth of Kazakhstan (Kulgildinova *et al.*, 2018; Thomas, 2015).

The reforms embodied in the Plan of Nation substantiate the need to create effective, efficient, and fast methods to learn and master the languages. In this regard, the development of rigorous learning tools is required. Among them is a dictionary that helps teach any language and assess the level of language competence. In a dictionary, it is essential to "maintain consistency and predictability when the nature of language requires each concept to be treated individually" (Niininen *et al.*, 2017, p. 451). Any dictionary should reflect the cultural aspect of society since students have to struggle against cultural and social discrepancies in a trilingual environment (Haim, 2019; Rohmatillah, 2016). Following the trilingual policy in Kazakhstan, enculturation of the young generation is also a top priority (Kassymova, 2017) and the method of integrated teaching of subject and language should be the primary method of language teaching in the country (Syrymbetova *et al.*, 2017; Ongarbaeva *et al.*, 2015).

The transition from general to higher education in Kazakhstan involves using trilingual dictionaries when teaching general and specialized subjects. Trilingual educational dictionaries have proved to be useful to learn foreign languages so terminological trilingual ones are actively being developed for use in various spheres of human activity (Mazhitayeva *et al.*, 2016). Accurately, in 2013 the Ministry of Foreign Affairs of Kazakhstan presented Kazakh-English-Russian and Russian-Kazakh-English dictionaries containing word-combinations and terms related to diplomacy, modern politics to diplomats, translators, teachers, and students (Nur-Sultan, 2013).

A search for relevant teaching techniques and the development of information technology

should go hand in hand to produce a user-friendly dictionary for learners (Rohmatillah, 2016). Therefore, it is vital to create a trilingual electronic dictionary (e-dictionary) that encompasses a broad range of videos, photos, and audio data from both linguistic and cultural contexts (Granger, 2012). Detailed information on each term, visualization of term relations, and real-life usage examples (Horák *et al.*, 2019) contribute to the success of an e-dictionary. The mind-map concept explains the visual representation of the data as well as ideas associated with them (Wang & Dostál, 2018). In this way, the dictionary will assist in sampling lexicographic material relevant to multilingual education. This dictionary will be especially convenient to use within the school curriculum since such mind maps will draw learners' attention to the studied material in a beneficial way (Akçadağ, 2010).

Trilingual e-dictionaries are indispensable when there is a shortage of relevant school subject textbooks (Suleimenova *et al.*, 2018) and Kazakh-Russian-English dictionaries in Kazakhstani state schools due to a recent introduction of the national language policy. High school students have to grasp basic concepts in natural sciences in English when immersed in content and language integrated learning (Syrymbetova, 2017; Ydyrys *et al.*, 2019). In particular, chemistry, physics, computer science, and biology will be taught in English since 2019 ("Textbooks in English," 2017). So such students' knowledge of Kazakh and Russian used in secondary schools will help them better understand life and physical science in high school.

There is an urgent need to design a biological e-dictionary to bridge the gap of insufficient subject textbooks where the main concepts of biology as a life science should be displayed. Therefore, it is of vital importance to implement a project to create an e-dictionary of biological terms with the embedded linguocultural component. This component is supposed to offer students not only all the necessary lexicographic information about a particular biological name as mind maps but also peculiarities of its representation in Kazakh, Russian, and English linguacultures.

The article aims to describe how to analyze and systemize the lexicographic material selected for developing a trilingual e-dictionary of biological terms for Kazakhstani school learners. The authors intend to produce the dictionary (Russian-Kazakh-English, English-Russian-Kazakh, and Kazakh-Russian-English) that encompasses the entire Kazakh school biology curriculum in an

electronic form. Within the research aim, it is proposed to analyze the current situation with trilingualism in the Kazakh education system. Next, it is planned to describe the initial stage of creating a biological trilingual e-dictionary, with the linguocultural aspect and mind-mapping technique considered. Finally, it is intended to present the findings relevant to the main steps of the stage. In particular, the focus is on the selection and analysis of lexicographic units from the school biology curriculum in Kazakhstan. Then organic unification of the lexicographic material is determined and compositional parameters of the e-dictionary are established.

Driving forces of developing a trilingual e-dictionary are transition from bilingualism to trilingualism within the Kazakh national education system (Amalbekova, 2013). Trilingualism in Kazakhstan is a unique project intended to help students and teachers switch immediately between Kazakh, Russian, and English (Yeskeldiyeva & Tazhibayeva, 2015). Implementation of the trilingualism project in the Nazarbayev Intellectual Schools throughout Kazakhstan enabled to introduce and execute the plan in general schools all over the country.

Large-scale changes in the education system require the recruitment of trained personnel capable of teaching humanitarian and natural subjects in different languages. The staff should also be able to update teaching methods to meet global best practices. As noted by Jantassova (2015), a working knowledge of English alongside the Kazakh and Russian languages now forms the basis for ensuring a high level of educational quality nationally and consequently the development of international cooperation. Indeed, upgrading teaching skills within Kazakhstan is a top priority nowadays although educators face a 'switching codes' issue because of the transition to trilingualism (Ishmuratova, 2016).

On the other hand, teaching aids, including a library fund for schools, have not adapted adequately to the new realities so far. Of course, changes in teaching methods require designing new teaching aids, renewal of school library funds, and providing access to scientific literature and reference books that conform to multilingualism principles (Kosybaeva *et al.*, 2017). A lack of specialized literature on subjects in English as well as printed and online terminological dictionaries explain the need to supply the educational process with working materials on the topics. Akhmetova (2018) states that glossaries of terms and thesauruses present terminology that can only be

systematized and unified, but not standardized.

Baynieva and Umurzakova (2015) highlight the apparent shortage of relevant trilingual dictionaries in both regular schools and universities within Kazakhstan. The researchers also state that students' acquisition of communicative and linguistic competencies directly depends upon their mastery of the initial vocabulary of all the three languages. In their opinion, the use of trilingual dictionaries at schools and universities will help increase the level of Kazakh, Russian, and English spoken among students and teachers. Moreover, the Bologna Process necessitates the creation and use of e-learning tools to contribute to the development of general cultural and professional language competencies among students (Sysoeva, 2011). A published trilingual dictionary, as well as its electronic version, will, therefore, contribute to the Kazakh education system.

Zhakupova (2012) presents a review of state-of-the-art lexicographic products that include expanded capabilities. She notes that new dictionaries can capture a lot of information including a lexicographic description of words, even borrowed, inadequate, and old ones. These words should correspond to reality, history, and culture of native people. In the researcher's view, a multilingual dictionary organically continues the tradition of anthropocentric lexicography and is characterized by an extensive range of educational possibilities. A large number of users demand an ordered sequence of information that can be expanded by including texts in other languages from an empirical base. However, Yataeva (2016) claims that the structure and organization of an e-dictionary is entirely different from traditional paper counterparts. Indeed, the 'hypertext' of an e-dictionary allows a user to populate 'information zones' according to specific needs (p. 136).

Over the past decade, e-dictionaries have gone far ahead and have become increasingly popular with users as a tool of language learning in the digital era (Liu, 2017). It is also claimed that Macmillan Education announced the publication of only online dictionaries in 2012 (Frommer & Finegan, 2013). Online dictionaries are user-friendly (Müller-Spitzer *et al.*, 2012) since they mean an easy search, a vast database, constant upgrade, and accessibility. A dictionary in one's computer, tablet, laptop, or mobile phone allows accessing information about the language without carrying massive volumes of printed versions.

Despite the evident advantages of e-

dictionaries for learning, they do not seem to be a universal tool for each learner. Disregarding students' psychological and age peculiarities can lead to their unproductive work in class. Lew and Mickiewicz (2013) assert that the use of dictionaries is a two-way game, in which the players are the dictionary itself and the dictionary user. They add that the game proceeds smoothly only if they both perform well. Such performance is nevertheless not typical of schoolchildren so the focus should be on the visual representation, which is lacking in most dictionaries.

The contemporary schoolchildren are referred to the generation Z, who heavily uses gadgets in everyday life. Therefore, such learners develop a genuine visual culture and are immersed in online communication (Stanciu *et al.*, 2016). The learners are early adaptors of technology in the digitalized world so they tend to interact virtually, as Mladkova (2017) acknowledges. She also informs about the fact that such students often experience difficulty in comprehending long and complex texts. Nevertheless, they prefer to deal with short well-structured texts and animated pictures (Lew & Doroszewska, 2009).

The reviewed sources about e-dictionaries demonstrate current deficiencies in presenting lexicographic material in a way similar to that in a printed version. Neglecting some essential skills to work with dictionaries will result in the effective use of the e-learning tool to master foreign languages in content and language integrated learning. For schoolchildren, it is essential to lookup complete, short, and precise information supported with visual data as the standard vocabulary data will not appeal to school-age learners (Commodari, 2016). In turn, a brand-new innovative approach is required when designing an e-dictionary for the Generation-Z learners. In particular, developers must use bright, efficient, and picturesque materials such as infographics, presentations, mind maps, and ready-to-use structures. So the optical interface and graphics execution are advocated for.

As regards a trilingual e-dictionary of biological terms presented as thesaurus, convenient methods of displaying information are important as well. Besides, various criteria for searching for and grouping material should be taken into consideration. Of course, a trilingual e-dictionary of biological terms should encompass a linguocultural component, per the new educational policy of Kazakhstan.

2. MATERIALS AND METHODS:

It is planned to implement three main stages. They include determining sources of vocabulary selected to be included in the e-dictionary, designing and creating a printed version of a trilingual dictionary, and developing an electronic version and a web version of the dictionary.

This article reveals the first stage of the investigation, which involves creating high-quality, innovative products. This activity demands a specific approach, which should help them distinguish from other similar ones. In the context of the research, a linguocultural plan and mind-mapping are prioritized. As regards the linguocultural approach, it highlights the cultural aspect embodied in language. Culturally marked words have an impact on people who use them in their language (Bolt *et al.*, 2017) so their inclusion in an e-dictionary will demonstrate cultural specificity reflected in the language. The creation of the proposed trilingual dictionary will require the use of linguistic research methods including typological approaches, functional, parametric, and structural analyses, as well as language construction for an integrated dictionary model.

The dictionary model should reflect the peculiarities of different types of dictionaries. For instance, linguoculturological dictionaries include specific elements of the language, which are known as realities. There are also dictionaries of phraseological units, thematic dictionaries, dictionaries of nicknames, those of proper names. However, such dictionaries seem to be in demand only among people aimed at mastering the language at an advanced level. Or those who have once come across fragments of the language, which they do not understand, can address such dictionaries.

Next, mind-mapping allows deconstructing complex topics with the help of graphical representation of constituent issues and related themes (Kernan *et al.*, 2017). This approach enables learners to identify the item and select its specific aspect of their work. Application of the mind-map method is advantageous since it allows comprehending the chosen idea alongside with the visual representation of all sub-topics and interconnections. In recent years, the potential of mind-mapping has been considerably enlarged through the development of the relevant software. It enables the creation of digital mind maps, which are also attractive outside the classic scope of supporting learning (Dirnberger, 2016).

To achieve the research aim, it is necessary to specify the initial stage of the investigation: determining sources of vocabulary selected to be included in the e-dictionary. The methods of collecting linguistic data and their interpretation are employed here. Specifically, the primary task of this stage is to select and analyze lexicographic units related to biological terms from the Kazakh school curriculum. It is expected to select 28 items to cover the biology school course (from 1998 till 2017), including textbooks, tutorials, guides, school terminological dictionaries, etc. After selecting the vocabulary, it is necessary to conduct a preliminary analysis of biological concepts and terms. Then it is crucial to systematize them to consistently present generic and species features via mind-mapping.

Concerning the stage, organic unification of the lexicographic units should be determined, with linguocultural commentaries to accompany them taken into consideration. It is also necessary to specify compositional parameters of the e-dictionary for schoolchildren, schoolteachers, students, and university professors, which are based on mind-mapping.

3. RESULTS AND DISCUSSION:

During the initial stage of the research, it is intended to analyze and systemize the lexicographic material selected for developing a trilingual e-dictionary of biological terms for Kazakhstani school learners. Selection of the lexicographic material within the stage is based upon the cultural aspect of learning foreign languages. Usually, members of one culture easily perceive all information. Alternatively, those who study the language often find themselves in a predicament since they do not know the mentality and cultural characteristics of native speakers. As a result, communication fails. According to Shrestha (2014), "since culture comprises language as its part and it finds its survival in the expression of language, it can be said that culture and language are intricately interwoven" (p. 55).

The project participants acknowledge that each language is given a specific role in the case of trilingualism. English, for instance, is highly required in the professional field. The younger generation will be forced to learn the language along with the study of a discipline. About all the necessary materials for a school biology course, students will study it in English. Unlike in regular English classes, they will encounter neither English mentality nor cultural peculiarities to help them grasp both new concepts and a variety of

associated values. For example, the word monkey is translated as обезьяна (obezyana) into Russian. However, few schoolchildren know that the Russian verb обезьяничать (obezyannichat), which means frivolous childish behavior, has the same analog in English to monkey.

Another example is the biological term cloaca, which has a similar equivalent in Russian. However, the following linguocultural explanation helps memorize this term: cloaca defines sewage or surface water. There are numerous examples of similarities of cultures so they contribute to the assimilation of a separate nomination. Also, they give an idea of another cultural mentality and standard parallels in the worldview.

Creating a trilingual dictionary of biological terms incorporates a linguocultural component, which is consistent with the State Program of Education Development in the Republic of Kazakhstan for 2011–2020. This component determines the selection of lexicographic units presenting biological terms for school learners. All sections of the e-dictionary should contain lexicographic material from the school biology curriculum. It will be necessary to cover material from botany, ecology, zoology, physiology, anatomy, genetics, evolution, and molecular biology. The lexicographic content should be taken from the relevant Kazakh and Russian textbooks used in 6–11 grades at schools. The textbooks should be granted official approval to be used in the educational process (Appendix 1). Besides, it will be essential to examine English-language reference books within this discipline (Appendix 2). Another source of the lexicographic material is English-language websites that address this topic (Appendix 3).

Additional preparatory work will comprise the classification of the obtained data as well as linguocultural analysis of the selected terms. These processes demonstrate how the lexicographic units of biological terms can be analysed. Conceptual groups should distribute the subject keywords. The possible subject groups can be presented as origin of terms (compost – from Latin composites, which means compound), phraseological units (перекрыть кислород – close the oxygen, which means to block any action of people), the cultural meaning (in the United Kingdom, the bear and staff feature on the heraldic arms of the county of Warwickshire; bears appear in the canting arms of two cities, Bern and Berlin). The conceptual groups may show phytonyms and zoonima (Bunny Rabbit, Grey Wolf, Nanny Goat, Hafoc-wyrt, Hara-Wyrt, Gold-Wyrt, etc.).

The next step is to create an adequate linguocultural commentary to maintain organic unification of the selected lexicographic units. With this in mind, it is necessary to choose the texts that correspond to the logical and semantic structure of both the biology school course and academic requirements. Sources of the documents are English-language reference books and websites used for selecting the relevant lexicographic units. It is essential to consider such criteria for choosing the texts as language, time, mode, medium, domain (“Dictionaries,” 2013). An example of such a text is as follows: Commonly, animals, which means all animals, except humans. People differ in what they consider an animal: some would say that humans are distinct from animals (creationists, for example), while others would say that humans are animals (evolutionists, for instance). Some do not include lizards as animals; others do not include insects. The selected biological terms and linguocultural commentaries should be supported with illustrations.

The obtained linguistic data should be systemized under the compositional parameters of the e-dictionary. In this vein, it is necessary to prepare the relevant glossary articles, group the lexicographic material by sections and edit it, create a design directory, collate and correct illustrations, as well as edit the list of words (including adjustments, layout, and printing), and distribute the catalog.

However, an attempt to fill an article of a standard form with all elements selected for the funding project may be unreasonable. This attempt may result in obtaining an excessively heavy layer of information, which will cause students to feel anxiety and fatigue. In turn, the mind-map structure allows breaking up the elements into easily perceivable parts and enables them to add a linguocultural component.

Web software is chosen for organic unification of the selected lexicographic units. The software allows ordering and structuring information similarly to the standard mind map called Coggle for the e-dictionary frame formation. There are offered e-dictionary entries and ways to present them, delete and add parts as well as change their position simply and understandably. In other words, this collaborative application encourages producing a specific composition. It meets average schoolchildren’s demands to study biology in English, which is to perceive and comprehend information about a biological term in one clear concept (Figure 1).

Since the mind map is a remarkable way to

introduce the vocabulary information, it is a good idea to separate all aspects of a biological term and turn them into a much more comfortable way to spot. Above all, visual areas prove to be beneficial for e-dictionary users since the visual representation allows splitting the data into short, understandable fragments. In other words, the proposed page layout presents an expedient meaning segmentation. Specifically, the ready-made logical model of a biological term is advantageous for learners since it makes its analysis and comprehension more accessible and simplifies the extraction of the word meaning. Within the trilingual e-dictionary, such a page layout keeps all the fragments of information in the same basic blocks. These blocks contribute to supporting communication among all the languages.

The advantages of creating a mind map substantiate the need to use it as a design entry of the trilingual e-dictionary of biological terms (Figure 2). In the attempt to present only the primary information in the e-dictionary, there are chosen such elements as pronunciation, meaning, cultural models, a picture or a video, an association, and synonyms and antonyms if there are any. Once entering a request, a student is expected to obtain a vivid picture showing the required information.

Students' interaction with the biological e-dictionary demands specific skills. Nesi's research findings (2015) allow outlining four main ones. The first skill involves interpreting morphological and syntactic information. Next, students should understand the definition or translation. As regards the third skill, it is vital to interpret information about collocations. Deriving knowledge from examples is another essential skill.

The findings suggest that the dictionary is an effective e-tool used in content and language integrated learning. It is especially so when there is a lack of relevant specialized literature on the school subject of biology in English as well as printed and online terminological dictionaries. Now the priority is on students' and teachers' needs to switch immediately between Kazakh, Russian, and English within trilingualism. In this context, schools have to recruit trained personnel able to update teaching methods to meet global best practices. Using tools of language learning in the digital era means promoting trilingual e-dictionaries in both regular schools and universities within Kazakhstan.

The page layout of the trilingual e-dictionary of biological terms reflects linguocultural

aspects of the selected and analyzed lexicographic units. This lexicographic material is systemized via the mind-mapping method. In this way, the findings show successful completion of the main tasks connected with creating a new way of dictionary entry organization, which is suitable for students of the current generation Z. This way corresponds to the students' demands to utilize products with such characteristics of information metabolism as fast, short, precise and visual. Employing such products in the educational process enables to develop learners' critical thinking and analytical skills, which undoubtedly affect the quality of learning and students' future academic achievements.

The search for articles devoted to trilingual dictionaries in journals indexed in Scopus and Web of Science since 2014 shows that researchers focus on both lexicographic material and the visual representation. However, rare articles highlight the linguocultural component embedded in the e-dictionary. Only Salipande (2018) emphasizes the cultural aspect of language preservation when investigating the lexical level of the Lopez Agta language. This idea is reflected in a trilingual thematic visual dictionary, which embraces such languages as Agta, Filipino, and English, although the researcher's aim differs from the authors' it is achieved through the linguocultural component of lexicographic units and their visual representation in the printed thematic dictionary.

As regards the visual representation of an e-dictionary, AlQallaf (2018) designs a sign language bilingual dictionary explicitly for hearing impaired and deaf individuals. The Arabic and American sign languages require a web-based platform where such individuals can communicate with others. High accessibility of visual interface enables its developers to integrate the dictionary with a new sign language. Therefore, the potential of the web-based dictionary to become trilingual is rather high. Despite the evident benefit of the visual representation of the e-dictionary, the researcher does not specify the linguocultural component of lexicographic units.

Another platform makes a trilingual online technical dictionary advantageous for Georgian learners. As Margalitadze (2018) claims, a Multilingual Dictionary Management System is specially developed to create Georgian online terminological dictionaries. The researcher uses English, Russian, and Georgian to present specialized vocabulary of different domains. The focus is on terminological synonymy and polysemous words as well as new terminology,

which requires the introduction of collocations and examples of the usage of the term. Still, the researcher does not identify the linguocultural component and seems to restrict the visual representation of technical terms.

Torrent *et al.* (2014), who cover such domains as soccer, tourism, and the World Cup within the Copa 2014 Frame Net Brazil project, develop the sports e-dictionary. The researchers implement the trilingual annotation to populate the Copa 2014 database. They also create the Translation relation, a computational solution to deploy frames as interlingual representations concerning Portuguese, Spanish, and English. Although the researchers promote multilingual lexicographic annotation for their e-dictionary, they do not establish the cultural aspect relative to the thematic lexicographic material.

Dollah *et al.* (2017) center on a mobile application on iOS and Android to develop the trilingual glossary of such terms as Islamic banking and finance. The rapid prototype instructional design model is the basis of developing the mobile terminology glossary app. Here the stress is on the visual representation rather than the linguocultural component of lexicographic units from the Malay, Arabic, and English languages.

So the current publications revealing trilingual e-dictionaries posit some deficiencies mostly relative to the linguocultural component of the lexicographic material embedded in the web software. On the other hand, data about specific web platforms can help further address the visual representation of the selected content.

4. CONCLUSIONS:

The introduction of trilingualism throughout Kazakhstan has caused to tackle a difficult task. It involves integrating the teaching of the biology school course, three languages (Kazakh, Russian, and English), and the cultural aspect. These ideas are considered when developing a trilingual e-dictionary of biological terms primarily for high school learners. Enculturation of the young generation known as the generation Z makes the authors of the article include the linguocultural component in the selected lexicographic material. This component is lacking in most trilingual thematic e-dictionaries, which makes the current research outstanding. Additionally, the visual representation, which is insufficient in most printed dictionaries, should be prioritized in the biological e-dictionary for school learners. Optical interface and graphics execution are presented via mind-mapping to display the biological terms to

advantage.

Overall, this article reveals the first stage of the investigation, which means determining sources of vocabulary selected to be included in the e-dictionary. Selection of the lexicographic material within the scene is based upon the cultural aspect of learning foreign languages. Primarily the article describes how to select and analyze lexicographic units relative to biological terms from the Kazakh school curriculum. The linguocultural component reveals the cultural aspect of learning foreign languages, which allows perceiving another cultural mentality and standard parallels in the worldview. Also, there is a classification of the obtained data and linguocultural analysis of the selected terms.

Next, there was determined organic unification of the lexicographic units by creating an adequate linguocultural commentary. There were also identified compositional parameters of the e-dictionary based on mind-mapping, which is a design entry of the trilingual e-dictionary of biological terms. Systemization of the obtained linguistic data was done via the web software Coggle for the e-dictionary frame formation.

As regards the second stage, it is planned to design and create a printed version of the trilingual dictionary during the second year of work on the funding project. With this in mind, a philological method will help prepare the glossary articles, systemize materials by sections and edit them, create a design directory, collate and correct illustrations, as well as edit the list of words (including adjustments, layout, and printing) and distribute the catalog.

During the third stage, it is proposed to design an electronic version of the dictionary and its web version. In this vein, it is meant to differentially group the materials and search for several variants of each criterion. The first step of the stage will involve creating a software platform that includes both a creative and intuitive interface. Secondly, it is planned to develop a specialized search system that emphasizes the needs of the research process. Thirdly, it is necessary to identify the critical features of all the information contained in the e-dictionary. This will enable description of mechanisms for analyzing entries as search engine parameters are developed. Lastly, it is proposed to form a structural resource database.

The stage of direct application of the mind-map dictionary structure is scheduled for the third year of the funding project. Additional verifications of representing the ideas, consultation with

students and teachers will be required. There may be some technical problems associated with programming this kind of dictionary page. There might be additional elements for a dictionary entry that should be included in the trilingual dictionary. These and other questions can be solved only during practical work with the funding project.

The trilingual e-dictionary of biological terms is planned to be only web-based. The project participants are in search of web-programmers who will manage to create the relevant e-dictionary and will further assist in developing a mobile application. The web-based dictionary and mobile app will bring the funding project closer to students by satisfying the needs of the generation Z to have information readily available.

5. REFERENCES:

1. Akçadağ, T. *Bilig*, **2010**, 53, 29-50.
2. Akhmetova, M. *The Journal of Language Research and Teaching Practice*, **2018**, 2(2), 1-12. doi:10.32788/jlrtp.02.6-15.
3. AlQallaf, A.H. *Journal of Engineering Research*, **2018**, 6(2), 84-102.
4. Amalbekova, M. *Middle East Journal of Scientific Research*, **2013**, 14(9), 1152-1155. doi:10.5829/idosi.mejsr.2013.14.9.2228.
5. Baynieva, K.T., Umurzakova, A. Z. *International Journal of Applied and Fundamental Research*, **2015**, 8(4), 776-779. (in Russian).
6. Bolt, I.V., Szerszunowicz, J. *Neofilologia dla przyszłości*, **2017**, 2, 229-242.
7. Chukenayeva, G., Smagulova, G., Sarbasova, K., Rakhimova, A., Saduakasova, S., Turysbekova, A. *Journal of Language and Literature*, **2016**, 7(3), 5-13. doi:0.7813/jll.2016/7-3/1.
8. Commodari, E. *Perceptual and Motor Skills*, **2016**, 122(3), 855-870. doi: 0.1177/0031512516652034.
9. Dave, B. *Kazakhstan – Ethnicity, Language and Power*. London: Routledge, 2007. doi:10.4324/9780203014899.
10. *Dictionaries: An International Encyclopedia of Lexicography*. (Gouws, R. H., Heid, U., Schweikard, W., Wiegand, H. E. Eds.). Berlin/Boston: Walter de Gruyter, 2013.
11. Dirnberger, D. *World Patent Information*, **2016**, 47, 12-20. doi:10.1016/j.wpi.2016.08.004.
12. Dollah, N.H., Ghalib, M.F.M., Sahrir, M.S., Hassan, R., Zakaria, A.W., Omar, Z. *International Journal of Interactive Mobile Technologies*, **2017**, 11(3), 145-161. doi:10.3991/ijim.v11i3.6620.
13. Frommer, P.R., Finegan, E. *Looking at Languages: A Workbook in Elementary Linguistics*. Stamford, USA: Cengage Learning, 2014.
14. Granger, S. Electronic lexicography – from challenge to opportunity. In S. Granger., M. Paquot (Eds), *Electronic Lexicography*. Oxford: Oxford University Press, 2012. doi:10.1093/acprof:oso/9780199654864.001.0001.
15. Haim, O. *Intercultural Education*, **2019**, 30(5), 510-530. doi: 10.1080/14675986.2019.1598095.
16. Horák, A., Baisa, V., Rambousek, A., Suchomel, V. *International Journal on Artificial Intelligence Tools*, **2019**, 28(2), 1950008. doi:10.1142/S0218213019500088.
17. Ishmuratova, M.Yu. *Proceedings of Youth and Current Global Issues*, **2016**, 341-346. (in Russian).
18. Jantassova, D. *Procedia – Social and Behavioral Sciences*, **2015**, 177, 136-141. doi:10.1016/j.sbspro.2015.02.364.
19. Kassymova, G. *Turkish Online Journal of Educational Technology*, **2017**, 17, 591-595.
20. Kernan, W. D., Basch, C. H., Cadorett, V. *Pedagogy in Health Promotion*, **2017**, 4(2), 101-107. doi:10.1177/2373379917719729.
21. Kosybaeva, U., Shayakhmetova, M., Utebayev, I., Syzdykova, N., Abishev, Z., Orazbekova, R. *Espacios*, **2017**, 38(35). Retrieved from <http://www.revistaespacios.com/a17v38n35/a17v38n35p28.pdf>.
22. Kulgildinova, T., Zhumabekova, A., Shabdenova, K., Kuleimenova, L., Yelubayeva, P. *XLinguae*, **2018**, 11(1), 332-341. doi:10.18355/XL.2018.11.01.28.
23. Lew, R., Doroszevska, J. *International Journal of Lexicography*, **2009**, 22(3), 239-257. doi:10.1093/ijl/ecp022.
24. Lew, R., Mickiewicz, A. From paper to electronic dictionaries: Evolving dictionary

- skills. In Kwary, D. A., N. Wulan, L. Musyahda (Eds), *Lexicography and Dictionaries in the Information Age. Selected Papers from the 8th ASIALEX International Conference*, 2013, (79-84). Surabaya: Airlangga University Press. Retrieved from: https://www.researchgate.net/publication/265252133_From_paper_to_electronic_dictionaries_Evolving_dictionary_skills.
25. Liu, X. *Lexikos*, **2017**, 27, 287-309. doi:10.5788/27-1-1404.
 26. Margalitadze, T. *EURALEX Proceedings*, **2018**, 339-350. <http://euralex.org/wp-content/themes/euralex/proceedings/Euralex%202018/118-4-2995-1-10-20180820.pdf>.
 27. Mazhitayeva Sh., Akhmetova A., Zhunusova A., Azhigenova S. *Bulletin of the Peoples' Friendship University of Russia. Education Issues Series: Languages and Specialty*, **2016**, 4, 50-56. Retrieved from <http://journals.rudn.ru/polylinguality/article/view/14659/13730>.
 28. Mladkova, L. *Proceedings of the 18th European conference on knowledge management (ECKM 2017)*, **2017**, 1-2, 698-703.
 29. Müller-Spitzer, C., Koplenig, A., Töpel, A. Online dictionary use: Key findings from an empirical research project. In S. Granger, M. Paquot (Eds.), *Electronic Lexicography*. Oxford: Oxford University Press, 2012. doi:10.1093/acprof:oso/9780199654864.003.0020.
 30. Nesi, H. The specification of dictionary reference skills in Higher Education. In *Dictionaries in Language Learning: Recommendations, National Reports and Thematic Reports from the TNP Sub-Project 9: Dictionaries*, 2015, (53-67). Berlin: Freie Universität. Retrieved from <https://pureportal.coventry.ac.uk/files/3940949/Nesi1999.pdf>.
 31. Niininen, S., Nykyri, S., Suominen, O. *Journal of Documentation*, **2017**, 73(3), 451-465. doi:10.1108/JD-06-2016-0084.
 32. Nur-Sultan *Kazakh Foreign Ministry presented trilingual diplomatic dictionaries. Kazakhstan 2050*. Retrieved from <https://strategy2050.kz/en/news/4250>.
 33. Ongarbaeva, A.T., Kondybaeva, M.R., Sebepova, R.M., Smanov, B.U., Karimova, G.S. *Journal of Language and Literature*, **2015**, 6(4), 337-342. doi:10.7813/jll.2015/6-4/62.
 34. *President Nazarbayev unveils 100 concrete steps to implement five institutional reforms* (June 2, 2015). Retrieved from https://www.inform.kz/en/president-nazarbayev-unveils-100-concrete-steps-to-implement-five-institutional-reforms_a2782614.
 35. Salipande, A. L. *2nd Advanced Research on Business, Management and Humanities (ARBUHUM)*, **2018**, 24(4), 2392-2394. doi:10.1166/asl.2018.10961.
 36. Shrestha, K. *Journal of NELTA*, **2016**, 21(12), 54-60. Retrieved from <https://www.nepjol.info/index.php/NELTA/article/view/20201/16601>.
 37. Stanciu, D., Stefan, L. *Pour une Europe forte, renover les structures economiques, entrepreneuriales, politiques, territoriales et educatives*, **2016**, 289-298.
 38. State programs: Government of Kazakhstan on results of activities for 2017 (June 20, 2018). Retrieved from <https://primeminister.kz/en/news/all/16716>.
 39. Suleimenova, E. D., Kozhamkulova, G.E., Urazaevac K.B. *Journal of Siberian Federal University. Humanities & Social Sciences*, **2018**, 6, 987-1001. doi:10.17516/1997-1370-0288.
 40. Syrymbetova, L.S., Zhumashev, R.M., Nugmetuly, D., Shunkeyeva, S.A., Zhetpisbayeva, B.A. *Novosibirsk State Pedagogical University Bulletin*, **2017**, 7(4), 72-92. doi:10.15293/2226-3365.1704.05 (in Russian).
 41. Sysoeva, L.A. *Journal of International Scientific Publications: Educational Alternatives*, **2011**, 9(2), 127-134. Retrieved from <https://www.scientific-publications.net/download/educational-alternatives-2011-2.pdf>.
 42. Textbooks in English to be introduced in Kazakh schools (February 6, 2017). *Kazinform*. Retrieved from https://www.inform.kz/en/textbooks-in-english-to-be-introduced-in-kazakh-schools_a2996346.
 43. Thomas, M. *Central Asian Survey*, **2015**, 34(4), 456-483. doi:10.1080/02634937.2015.1119552.

44. Torrent, T.T., Salomão, M.M.M., Da Silva Matos, E.E., Gamonal, M.A., Gonçalves, J., De Souza, B.P., Gomes, D.S., Peron-Corrêa, S.R. *Constructions and Frames*, **2014**, 6(1), 73-91. doi:10.1075/cf.6.1.05tor.
45. Vanderhill, R., Joireman, S.F., Tulepbayeva, R. *Europe – Asia Studies*, **2019**, 71(4), 648-670. doi:10.1080/09668136.2019.1597019.
46. Wang, X., Dostál, J. *ACM Conference Proceedings series*, **2018**, 150-153. doi:10.1145/3291078.3291121
47. Yataeva, E.V. *Bulletin of the Chelyabinsk State Pedagogical University*, **2016**, 10, 135-140.
48. Yeskeldiyeva, B.Y., Tazhibayeva, S.Z. *Asian Social Science*, **2015**, 11(6), 56-64. doi:10.5539/ass.v11n6p56
49. Ydyrys, A., Srail, S., Ydyrys, S., Basygarayev, Z., Mautenbaev, A., Baidalet, T. *Universal Journal of Educational Research*, **2019**, 7(8), 1698-1706.
50. Zhakupova, A.D. *Russian Journal of Lexicography*, **2012**, 2, 66-75. (in Russian).

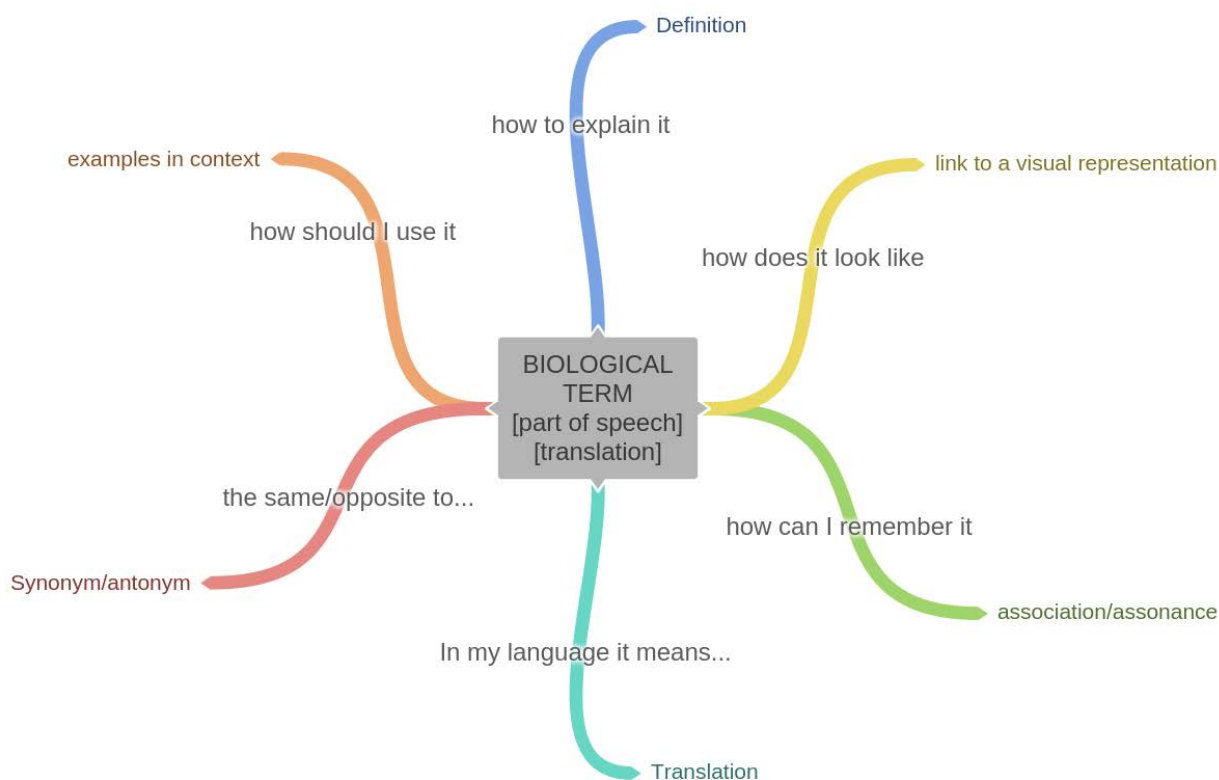


Figure 1. The Coggle mind map of a biological term

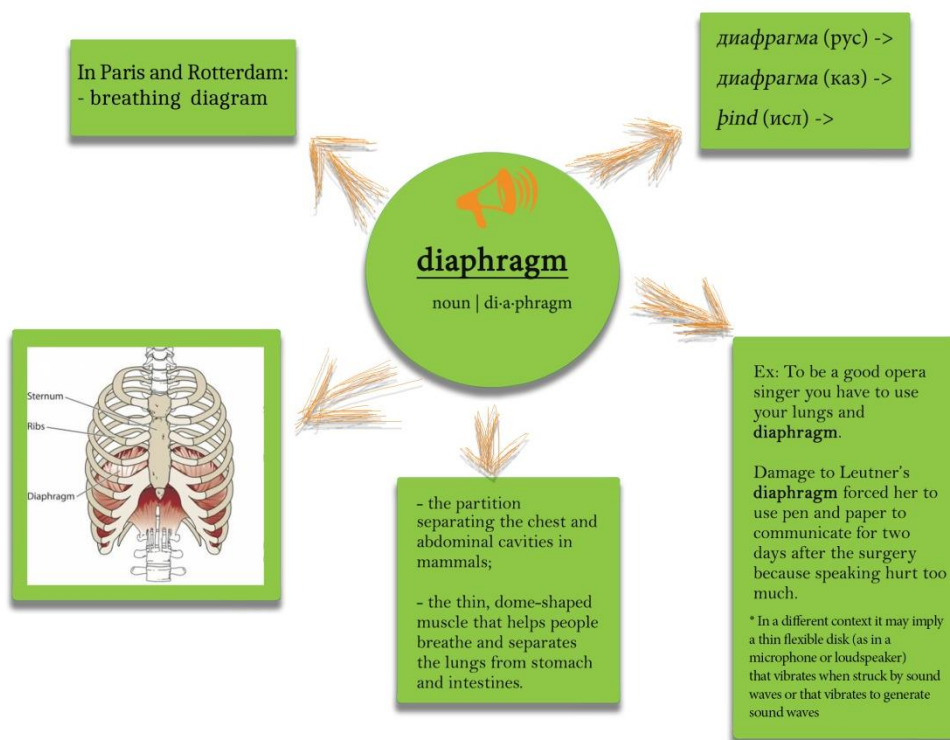


Figure 2. A design entry of the trilingual e-dictionary of biological terms

Appendix 1. List of textbooks of Biology 6-11 grades

- Ochur, E., Kurmanalieva, Zh. (2017). Biology. Textbook. 6th grade. Almaty: Mektep. p. 147.
- Shildebaev, Zh., Kozhantaeva, Zh., Amanzholova, L. (2013). Biology. Almaty: Mektep. p. 116.
- Solovieva, A., Alina, A., Ibraimova, B. (2017). Biology. Textbook. 7th grade. Almaty: Atamyra. p. 230.
- Soloviev, A.R., Ibraimova, B.T. (2018). Biology. Textbook. 8th grade. Almaty: Atamyra. p. 220.
- Alimkulova, R., Satimbekov, R., Solovieva, A. (2016). Biology. Textbook. 8-9th grade. Almaty: Atamyra. p. 250.
- Ermetov, B., Sagintaev, A., Kendzhi, B., Akhmetova, A., Nuralieva, L., Dzhiilkaidarova, A., Karimova, N. (2017). Biological bilingual textbook. 8th grade. Astana: Mektep. p. 200.
- Sartaev, A., Gilmanov, M. (2014). General biology. Textbook. 10th grade. Almaty: Mektep. p. 245.
- Satimbekov, R., Shildebaev, Zh. (2015). Biology. Textbook. 11th grade. Almaty: Mektep. p. 215.
- Kovshar, A., Solovieva, A. (2015). Biology. Textbook. 11th grade. Almaty: Atamyra. p. 270.

Appendix 2. List of English-language reference books

- Renu, E., Sekar, T., Sankar, T.P., Munusamy, T.S. (2006). Botany. Textbook. Tamil Nadup. p. 159.
- Robertson, K.R., Downie, S.R. Mason, S.L. (2014). Botany. Master Naturalists. p. 50.
- Shipunov, A. (2017). Introduction to Botany. Lecture notes. North Dakota, USA: Minot State University. p. 173.
- Sologub, L.I. (2003). Zoology in English. Textbook. Samaata: Samara University Publishing House. p. 73.
- Naumov, D.V. (2015). Zoology. Textbook for schools. Moscow: Mir. p. 216.
- Ishmuratova, M.Yu., Tusupova, G.S. (2016). Russian-English-Kazakh dictionary of biological botany terms (6th grade).Karaganda: . p. 24..
- Alzhanova, R.K., Tusupova, G.S. (2018). English-Russian-Kazakh glossary (biology 8th grade). Karaganda: ShOD Daryn. p. 12.
- Interactive style training manual Biology – Animal. – Astana, 2018. – 2.3 Gb.
- Sadykova, A.R. (2012). English for biotechnologists and biologists. Textbook. Izhevsk: . p. 238.
- Afanasieva, I . et al. (1979). English-Russian biology dictionary. Moscow: Russkoe slovo. p. 732.
- Dambilton, K.U. (2000). Russian-English dictionary. Minsk-Kiev: Tekhnicheskii slovari. p. 525.
- Zarikov, M.D., Elemesov, K., Kaimov, K. (1991). Russian-Kazakh dictionary of biological terms. Almata-Ata: Rauan. p. 125.

Appendix 3. English-language websites

- sbio.info
- cellbiol.ru
- bioword.narod.ru
- ebio.ru
- virtulab.net
- biology-online.ru
- biology-online-org
- biodata.ru
- faunaflora.ru
- cengage.com
- khanacademy.org
- ibiology.org
- biology.ru
- biologydictionary.net