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ПОТЕНЦІАЛ ГРАФІЧНИХ ОРГАНІЗАТОРІВ У ВИВЧЕННІ АНГЛІЙСЬКОЇ МОВИ

Стаття розглядає візуальні засоби представлення взаємозв'язків між фактами, термінами та ідеями за допомогою схем, діаграм, карт, таблиць тощо у процесі вивчення іноземної мови. Візуалізація дозволяє спостерігати за об'єктами, процесами та явищами, змушуючи органи чуття людини працювати інтенсивніше; вона має специфічний емоційний вплив на студентів. У цьому випадку студенти сприймають і розуміють навчальний матеріал набагато легше і швидше, оскільки вони більш свідомо засвоюють знання і розвивають мовленнєві навички, що робить процес навчання більш доступним. У статті розглядаються різні візуальні засоби, такі як концептуальні карти, ментальні карти, семантичні карти, діаграми Венна та візуальні метафори. Автори аналізують літературні джерела з даної теми, описують та конкретизують особливості найбільш часто використовуваних засобів візуалізації. Автори висвітлюють основні характеристики візуальних засобів як навчальних інструментів. Вони визначають навички студентів у роботі з різними типами візуалізації як здатність сприймати, розуміти та інтерпретувати вербально-візуальну інформацію іноземною мовою та візуалізувати результати своєї мовної діяльності англійською мовою. Автори вважають, що викладачі можуть використовувати візуальні організатори для студентів з різним рівнем знання англійської мови під час пояснення нового матеріалу, повторення або закріплення вивченого матеріалу, а також перевірки або тестування цільового матеріалу; студенти також можуть використовувати графічні організатори для самостійного навчання. Водночас автори наголошують, що візуальні матеріали повинні відповідати змісту навчальних програм і підручників, методам і технікам навчання, а також відповідати конкретним науково-технічним вимогам. Графічна візуалізація не тільки активізує розвиток рецептивних і продуктивних мовних навичок учнів, але й підвищує продуктивність їхньої навчальної та дослідницької діяльності.

Ключові слова: *графічні організатори, засоби наочності, концептуальні карти, ментальні карти, семантичні карти, діаграми Венна, візуальні метафори.*

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THE POTENTIAL OF GRAPHIC ORGANIZERS IN ESL LEARNING

The paper focuses on graphic organisers as the visual means of representing relations between facts, terms, and ideas with schemes, diagrams, maps, tables, etc., in learning a foreign language. Visualization allows the observation of objects, processes, and phenomena, making a person's perception organs work more; it has a specific emotional impact on students. In this case, students perceive and understand educational material much more easily and quickly since they more consciously assimilate knowledge and develop language skills, thus making the learning process more accessible. The paper deals with various visual aids such as concept maps, mental maps, semantic maps, Venn diagrams, and visual metaphors. The authors analyse the literature sources on the subject, describe, define, and specify the features of the more often used aids of visuality. The authors identified essential characteristics of visual aids as teaching tools. They described the students' skills to deal with different types of visuality as the ability to perceive, understand, and interpret foreign-language verbal-visual information and to visualise the results of their linguistic activity in English. The authors believe that teachers can use visual organizers for students of different levels of English language knowledge when explaining new material, reviewing or consolidating the material learned, and checking or testing the target material; students can also use graphic organizers for self-study. At the same time, the authors emphasize that visuals should correspond to the content of curricula and textbooks, teaching methods, and techniques, and meet specific scientific and technical requirements. Graphic visuality not only activates the development of students' receptive and productive language skills but also increases the productivity of their educational and research activities.

Key words: *graphic organisers, visual aids, concept maps, mental maps, semantic maps, Venn diagrams, visual metaphors*

Problem statement and the research rationale. Today, when a foreign language serves as a means of communication and cognition, a tool for obtaining and accumulating information in the modern world, the need to master all types of language activity – speaking, listening, reading, and writing – becomes particularly important. Modern educational spaces feature various teaching strategies, alternative methodological solutions, and innovative approaches to teaching English as a second language. In the era of intense information flows, synthesized forms of data presentation have emerged, with graphic organizers being a particularly effective means of concisely and aesthetically visualizing information in a graphic-text format.

Latest research and publications. Visual representation of educational information for the formation, improvement, and development of foreign language communicative competence is a key issue in the methodology of foreign language teaching. Methodological literature defines graphic organizers as visual thinking tools that make pictures that demonstrate relationships between facts, concepts, or ideas. They guide students' thinking as they design the map or diagram [1]. Over the last decade, the issue of visualisation has received considerable attention in the scientific and educational community. Both domestic and foreign experts in language teaching emphasize the importance of graphic visualization when discussing the results of developing speaking, reading, listening, and writing skills among various learner categories [1-26]. Scholars believe that "visual communication is a primary transmitter of our cultural heritage, second only to the spoken word. The printed word, paintings, drawings, sculpture, photography, cartography, charts, diagrams, graphs, film, and television are all visual forms of communication, and they depend centrally on the complex process of visual cognition [2, p. 27].

However, despite the significant didactic value of graphic organizers as a means of teaching perception, understanding, and interpretation of foreign-language verbal-visual texts and visualisation of information when presenting new lexical material, there is a lack of theoretically sound methods for teaching foreign-language vocabulary based on visualisation tools in the context of the technical (military) university. The shortage of systematic, in-depth work on this issue at all levels of education, from preschool to higher education, as well as the existence of a large number of narrowly focused methodological developments for solving specific subject-specific tasks at each stage, significantly complicates the establishment of visualisation as a component of the didactic system [3, p. 197].

The aim of the research. This paper aims to theoretically substantiate and illustrate the practical application possibilities of graphic organizers in learning foreign language vocabulary by students from non-linguistic specialties. Achieving the goal implies solving the following tasks: (1) highlighting the approaches of scientists to interpreting various types of imaged and graphic visual organizers; (2) singling out the types of visual organizers; (3) clarifying their didactic capabilities and implementation in foreign language teaching/learning in the context of higher education.

The main research material. Visualisation is the key tool that allows any information to be presented effectively in a simple, understandable, and easy-to-perceive form [4, p. 123]. Teachers often use graphic organizers in foreign language classes. Graphic organizers provide a visual method for developing, organising and summarising students' learning. They help to structure disjointed information and facilitate the learning process by providing a scaffold for the development of ideas and the construction of knowledge [5]. Information represented through graphic organisers has the advantages of being simple, straightforward, and easy to visualize. Graphic organisers can help illustrate and construct ideas, arrange and/or sequence information, plan what to write, increase reading comprehension, brainstorm, organize problems and solutions, compare ideas, show

cause and effect, and more. 'The arrangement of content elements in a non-linear form, the designation of logical and causal relationships between them, provides a special clarity based on the structure and associative connections characteristic of long-term human memory" [6, p. 59]. It is of particular importance when learning new lexis since "visualization refers to our ability to make visual representations in our minds while learning vocabulary. It stimulates the imagination, enhances involvement with the text, and improves mental imagery" [7, p. 362].

Graphic methods of structuring information enable the visualization and presentation of information about concepts and their frame structure, facilitating an understanding of the internal structure of the frame and the assimilation of ideas and lexical units. They help focus on essential aspects of the relationships between concepts, which contributes to a deeper and more contextual understanding of foreign language vocabulary. Using graphic organizers in foreign language classes, students construct their mental model of the frame step by step. Each part of the diagram can serve as a link for memorizing information. Students can complete various problem-solving tasks to understand the components of a graphically presented frame, discuss its structure, and more.

Common types of graphic organizers, such as concept maps, mental maps, semantic maps, Venn diagrams, visual metaphors, and others, are sometimes grouped under the umbrella term cognitive maps. Some scholars use these terms interchangeably, while others distinguish them based on their structural peculiarities (e.g., hierarchical, radial, or free-form relationships). S. Gibbons claims that although "cognitive maps are the umbrella term for all visual representations of mental models, cognitive maps, mind maps, and concept maps are three different ways of visualizing a mental model, whether it belongs to the designer, the researcher, or the user. Each has its strengths and benefits" [8].

Other scholars view various graphic organisers as three powerful visual mapping strategies for organising, communicating, and retaining knowledge: cognitive mapping, mental mapping, and conceptual mapping. They believe that the cognitive mapping technique is underpinned by the theories of meaningful learning, mental model, external representation, visual representation, and externalized cognition. These theories lay the foundation for using cognitive mapping as a scaffolding tool in problem-based and inquiry learning, as well as an instrument for measuring students' thinking in problem solving [9]. O. Orda defines mind maps, cognitive maps, and concept maps as "intellect maps" and considers them tools that allow one to think using one's full creative and intellectual potential [10, p. 230]. But what these types of visualization or graphic organizers have in common is that "instead of highlighting individual elements and their relationships, these visualization techniques focus on the 'big picture', that is, the overall structure that allows information to be displayed or positioned in a meaningful way" [11, p. 204]. All visual maps help students consolidate the most important information (key concepts) from numerous class-related materials into one place and reflect students' understanding of the information in the class materials [12].

B. Guelton considers all mental maps "according to two different meanings and uses: (1) the internal representation of a traversed space (cognitive map), and (2) the representation of a set of entities or concepts (concept map, mind map)" [13].

Depending on the educational task and students' level of learning and cognitive activity, we can choose one type of graphic visualization that promotes accessible, conscious, and lasting development of communicative competence in students. The above graphic organizers are not the only ones that can be used in teaching language skills in foreign language classes; however, we believe that these organizers are the simplest and most effective. Let us look at them in more detail.

A convenient way to develop thinking, solve creative and everyday problems, take notes, and memorize information is the mental maps proposed by T. Buzan. T. Buzan's mind map technique has gathered incredible praise and an enormous worldwide following over the last few decades [14]. Mind maps can have free-form relationships since mind mapping is not based on any specific criteria or framework (Fig.1).

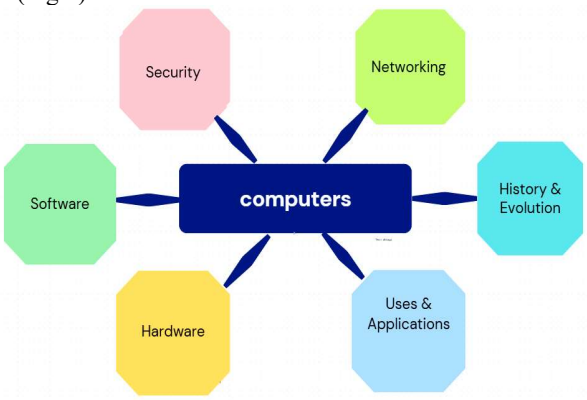

Fig. 1 Computers

Mind mapping leverages the brain's ability to recognize patterns and relationships, making it easier to recall and integrate new information. By incorporating colours, images, and symbols, mind maps engage both the logical and creative sides of the brain, resulting in a more comprehensive and engaging learning experience.

Mind mapping is a visual technique designed to unlock creativity, enhance memory, and improve problem-solving skills [15]. Mind maps

- enhance creativity: learners break free from conventional thinking and generate innovative ideas through a flexible and visual approach,
- boost memory and learning: learners improve retention and comprehension by engaging both sides of their brain, making complex information easier to understand and recall,
- improve organization and Productivity: learners streamline thoughts and tasks with a clear, hierarchical structure that aids in goal setting, time management, and project planning,

- develop critical thinking: learners utilize mind mapping to analyse and solve problems systematically, making informed decisions and exploring diverse solutions.

A more complex version of mind maps is concept maps. "Concept maps and mind maps are great personal learning tools that result in individual solutions, conceptual diagrams, and visual metaphors are tools for knowledge communication and joint knowledge construction" [11, p. 205]. Mind and concept have similar goals but differ in structure and application. The primary difference between mind maps and concept maps is that a mind map focuses on a single main idea or problem, whereas a concept map connects multiple ideas. Additionally, mind maps utilize lines to connect subtopics, whereas concept maps use arrows to represent relationships. Mind maps suggest unstructured brainstorming, whereas concept maps provide in-depth analysis to align on a solution. But both "concept maps and mind maps are great personal learning tools that result in individual solutions, conceptual diagrams, and visual metaphors are tools for knowledge communication and joint knowledge construction" [11, p. 205].

Some scholars consider learning to be meaningful when the learning outcomes take the form of concept maps, or networks of selected linguistic expressions and concepts. Concept-map-based education helps avoid rote learning, prepares content for effective on-ground and e-learning, and measures learning outcomes at the course, program, and institutional levels [16]. The authors of the conceptual mapping method, D. Novak and A. Kanas, define conceptual maps as "graphical tools for organizing and representing relationships between concepts indicated by a connecting line linking two concepts" [17, p. 1]. Concept maps are typically structured hierarchically, with more general and inclusive concepts positioned higher in the structure. [18, p. 6]. The core notion is on top or in the canter of a diagram. Further, lines extend from it, connecting the key concept with the second-order ideas (concepts) associated with it, which, in turn, connect the second-order ideas with more specific, clarifying third-order concepts, and so on. Secondary concepts can be related to both the general idea and to each other. Working with vocabulary, students determine more words related to the topic under consideration. As a result, they receive a hierarchical structure of conceptual ideas that are important for understanding a particular topic. Connecting words or phrases on the lines connecting concepts of different orders is an integral part of the conceptual map. The resulting conceptual map is a visual diagram of the topic's key ideas (concepts) and the relationships between them. Such conceptual maps represent substantive and, to some extent, linguistic support for students' responses (Fig. 2).

Concept maps "facilitate students' ability to internalize the new information; to deepen our understanding of the emerging themes; and they enable us to look for the interrelations among those themes towards building a model" [19, p. 707].

The way of visualising the semantic information associated with a particular concept is semantic mapping (semantic webbing). Semantic mapping, a categorical structuring of information in graphic form, has been successfully applied in various classroom settings since the 1980s [11].

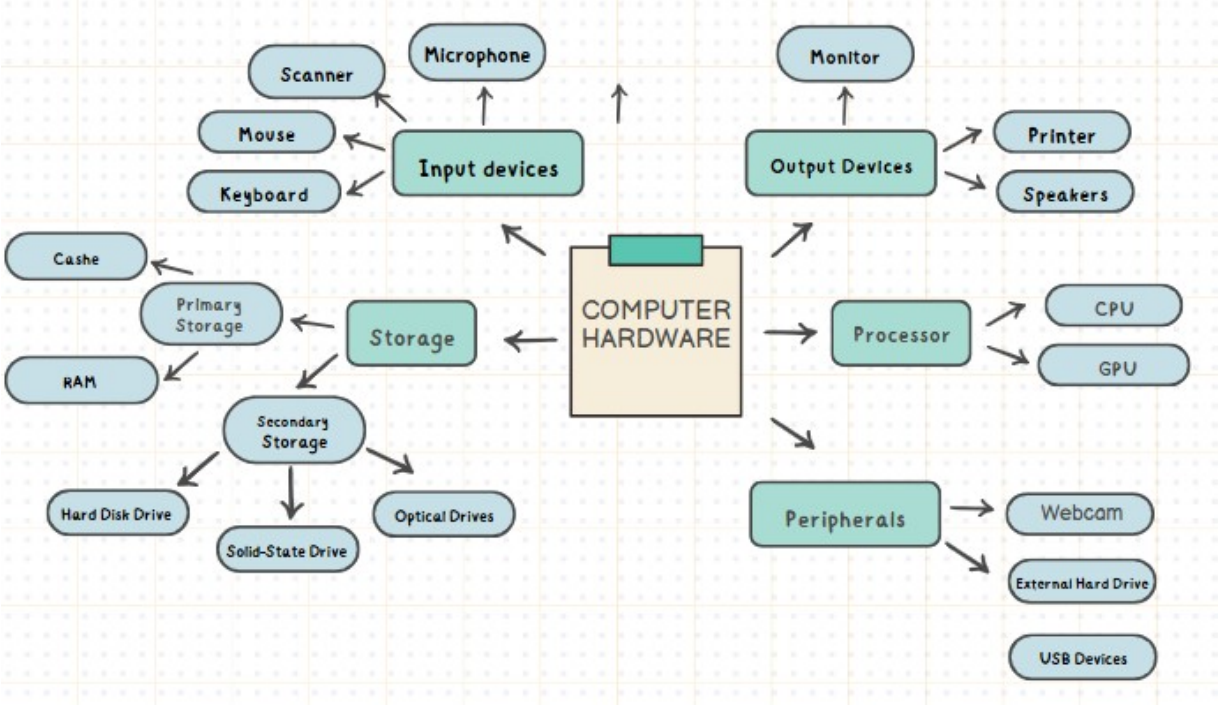

Fig. 2 Computer Hardware

A semantic map takes the form of a two-dimensional chart. It represents a selection of meanings ordered in space according to certain principles, and explicitly interconnected, thus forming a semantic network [20, p. 177]. We can define a semantic network as a labelled, directed graph with nodes representing physical or conceptual objects and arcs representing the relations between objects [21, p. 96]. Semantic maps represent information categorised in graphical form and are a strategy by which learners'

knowledge and vocabulary can be enhanced by quickly identifying and consolidating terms. By using semantic mapping technique for different vocabulary items, students can increase their abilities on vocabulary learning [22]. We understand a semantic map as a structure of lexical units united based on synonymous, antonymous, derivational, syntactic, and lexical connections. Semantic maps enable students to select words during the communication process. And if they cannot remember a word, they look for it in the semantic map. When teaching new words, the teacher should build vocabulary work so that the volume of the semantic map increases in both quantitative and qualitative terms.

Semantic mapping correlates with concept mapping. However, semantic maps and concept maps have different layouts – a mind map typically represents a central topic and its subtopics. Multiple levels of subtopics are connected to the central topic, and each subtopic has only one 'parent.' All the edges in the map that connect the 'parent' and subtopics are unlabelled and represented in the same way. A semantic network is basically a node-link structure as nodes in the network represent concepts and the links represent the relationship between these concepts [21, p. 105].

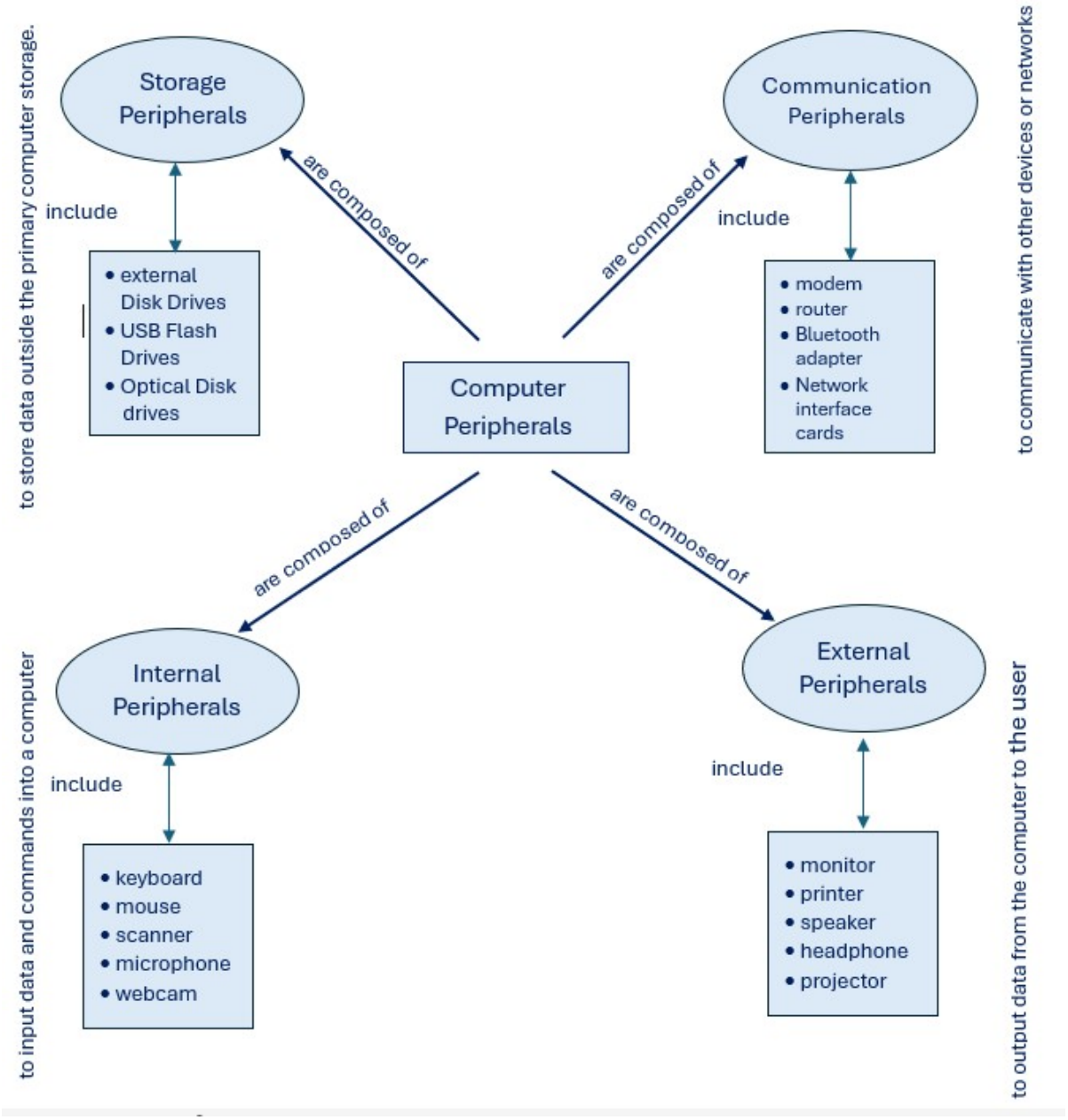

Fig. 3 Computer Peripherals

In a semantic map (Fig.3), relations can be implicitly described by 'sub-topic of', 'composed of', 'leads to', and so on. A semantic network is a model of the subject area represented as a graph, where vertices represent concepts and arcs (or edges) represent the relations between them. Concepts are usually abstract or concrete objects, and the most frequently used relations are the following taxonomic ones ('class - subclass - instance,' 'set - subset - element'; this type of relation is also called AKO = A Kind Of), structural

('part - whole'), functional (usually defined by verbs 'produce' 'affect', etc.), logical (AND, OR, NOT), and others.

Another widely used graphic organizer is the Venn diagram, popularized by John Venn in the 1880s. It is a graphical organizer constructed using overlapping circles. Each circle represents a different concept or group of data, and the overlapping areas represent common properties. A Venn diagram is a strategy that has a graphic organizer consisting of two overlapping circles. Many educators find Venn diagrams useful and feasible while teaching students "to compare two entities: characters, elements of the plot, settings, and experiences. It also helps the students to extend their thinking and apply the information by comparing and contrasting" [23, p. 61]. Using Venn diagrams to organize information graphically, students "can see the connections between two or three sets of items. Then, they can spot connections and differences" [ibid, p. 66].

Fig. 4 shows a Venn diagram representing the different branches of computer peripheral devices. The overlaps show where these devices intersect and share the functionality.

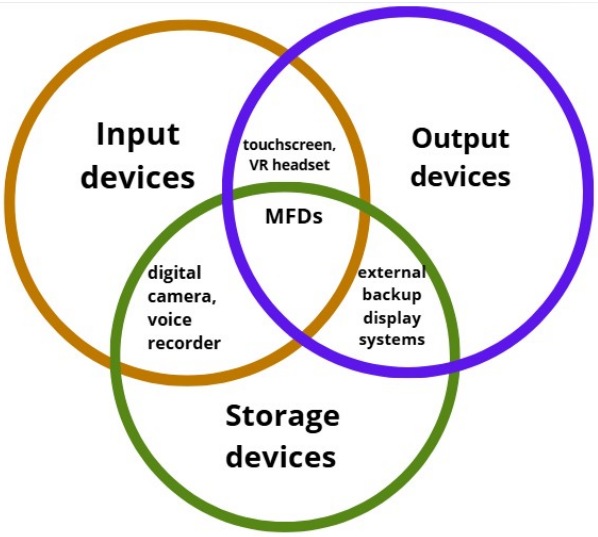

Fig. 4 Computer peripheral devices

Another visual tool used in the teaching-learning process is visual metaphors. Today visual metaphor has become one of the most widely used rhetorical devices in advertising. However, some scholars have paid attention to the interdisciplinary nature of visual metaphor, integrating it into other fields, such as linguistics [24, p. 17]. Researchers J. Lakoff and M. Johnson, studying the processes of metaphorisation, believe that its mechanism is based on the interaction of two knowledge structures, the "source" and the "target" [25]. The 'source' refers to specific knowledge, or a person's life experience. Metaphorical transfer occurs from the source domain to the target domain, which is a less specific form of knowledge. This makes metaphor a means of understanding abstract meanings in concrete, sensory images. Their approach is methodologically significant for us, as it allows us to examine the mechanisms of visual metaphor creation. M. Levunlieva defines visual metaphors as "patterns of thought. Regardless of the form in which a thought pattern is shaped, it is metaphoric as long as one item is reframed within the topology of another by projecting relations and elements from a source conceptual domain to a target one. Such conceptual constructs can be articulated or manifested through images, and this leads to visual metaphors" [26, p.8]. "Metaphor utilizes the familiar to explain the unfamiliar; or, it can recast (or defamiliarize) something already understood or misunderstood with something else familiar. This should not be minimized as an educational technique: the learner's base of knowledge is leveraged for a learning episode" [27, p. 6].

Fig. 5 illustrates such phenomena as

(a) *cloud computing*, which is the on-demand access of remote servers or computing resources over the internet

(b) *artificial intelligence,* which is a capability of computers to perform tasks typically associated with human intelligence, such as learning, reasoning, problem-solving, and decision-making.

(c) *Debugging*, which is the process of identifying and correcting errors or bugs in the source code of any software.

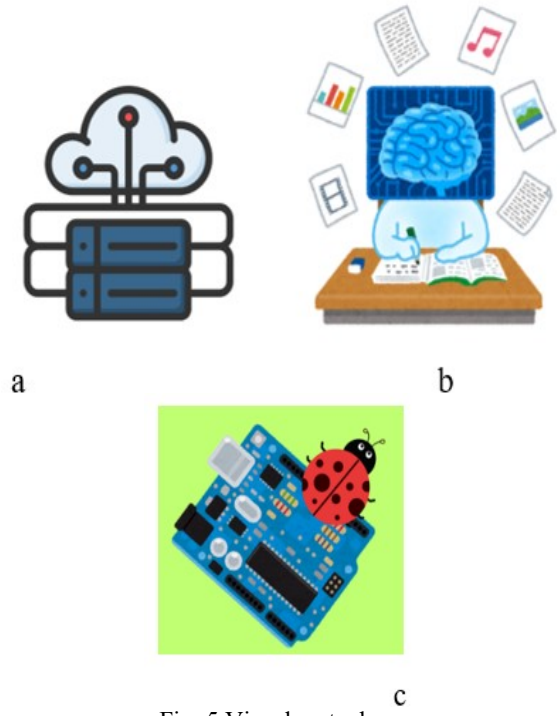

Fig. 5 Visual metaphors

The visualisation tools listed above have high didactic potential in the development of all four speech skills. For example, let us consider the possibilities of using graphic organizers in the teaching process. We can use graphic organisers to develop all types of speech activities, at every stage of work, namely: *before the activity* (reading, listening, speaking, writing), *during the activity,* and *after the activity*.

For example, we can provide visual metaphors (Fig. 5) at the *before-the-activity* stage to help students guess the probable topic of the lesson and predict the content of the topic proposed for discussion in the text.

We can suggest a mind map (Fig. 1) or a concept man (Fig.2) at the *during-the-activity* stage for structuring information to summarise the content of the text or audio file in a schematic form, where the suggested words or phrases denote the main ideas presented in the printed or audio text.

We can apply a semantic map (Fig. 3) as a meaningful basis for developing productive oral or written speech. Based on such semantic maps, where subjects and predicative forms used to describe the relationships between subjects are highlighted, students can reconstruct the content of the studied text, sticking to the narrative logic and the lexical units they have learned.

Using the Venn diagram (Fig. 4), students can discuss the similarities and differences between the target concepts to gain a comprehensive understanding of the issue under discussion, as part of an ongoing assessment to check their comprehension of the text content.

Many researchers and practitioners in Ukraine and abroad are working to modernize the educational process based on innovative information and communication technologies. Information technologies, which encompass tools for presenting, transmitting, and processing information, are widely utilized in the modern education system. The diversity of information presentation forms forces teachers to make choices based on specific educational goals and objectives, the peculiarities of modern students, and the general conditions of the educational process. To address problems that arise, a comprehensive approach is necessary, encompassing the analysis of contemporary forms of information presentation, processing, and transmission, as well as the identification of the didactic advantages of innovative educational resource formats within the context of traditional and innovative teaching and learning methods. One possible way to make the education process more efficient is through the use of graphic organisers, as described above, which better organise educational material and manage students' learning activities. The development of information technology enables the creation of a variety of visual aids using computer software. There are currently many such software products that facilitate teachers' work. Affordable (often free) technologies exist, such as FreeMind, XMind, and Free Mind Map – Freeware. However, teachers may need to purchase a software product to use the full programme and all its features – the software products that belong to the paid category are ConceptDraw MindMap, Mindjet MindManager, and iMindMap. There are online internet services that teachers can use to create visual organisers. Generally, these services require continuous internet access. They include Coggle, MindMeister, Bubbl.us, and Canva. Canva, for example, allows users to create digital and print content using ready-made templates, images, fonts, and editing tools. In this work, all of the visual aids presented were generated by the author using the cloud-based online graphic design service Canva.

Conclusions. The conducted research has enabled the author to conclude that using various graphic organizers in teaching vocabulary in a foreign language class contributes to creating and forming mental links between words and the concepts associated with them. As a result, students do not merely memorize individual lexical units but learn them in the context of interrelationships, which contributes to the development of the ability to distinguish and combine concepts and lexical units. Organisation of knowledge and orientation on the existing conceptual structure greatly facilitates the process of learning foreign vocabulary.

Visual organizers are a powerful tool in language learning, in general, and have excellent potential for vocabulary learning in particular. The method of visualization involves the learner creating mental images to represent information, making it easier to remember and retrieve, since visualization aids in the conversion of new words into easily recallable images.

Modern technologies for building and using visualisation tools allow both teachers and students to create a flexible (adjustable and developable) information environment within the studied topics. Working in such an environment helps students form a relatively complete system of basic lexical knowledge, develop self-learning skills, and manage their own learning activities, which is consistent with the main goals of student-centred learning.

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ВІДОМОСТІ ПРО АВТОРА

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ВИКОРИСТАННЯ ІНФОРМАЦІЙНО-КОМУНІКАЦІЙНИХ ТЕХНОЛОГІЙ У ПРОФЕСІЙНІЙ ПІДГОТОВЦІ МАЙБУТНІХ УЧИТЕЛІВ

Професійна підготовка педагогів в умовах закладів вищої освіти має відповідати викликам часу та забезпечувати не лише ґрунтовні фахові знання, а й уміння ефективно використовувати ІКТ у педагогічній діяльності.

У статті здійснено аналіз ролі інформаційно-комунікаційних технологій у професійній підготовці майбутніх учителів.

Встановлено, що використання інформаційно-комунікаційних технологій у процесі професійної підготовки майбутніх учителів сприяє підвищенню якості освіти, розвитку творчого потенціалу студентів, формуванню їхньої готовності до інноваційної педагогічної діяльності та неперервного професійного розвитку. Застосування ІКТ дозволяє індивідуалізувати навчання, забезпечити доступ до якісних освітніх ресурсів, підвищити мотивацію студентів та сприяти активному залученню їх до освітнього процесу.

З-поміж ІКТ освітнього призначення виокремлено такі види: інформаційно-когнітивні (орієнтовані на самостійне засвоєння понять); навчально-контролювальні та тренувальні (для закріплення знань, умінь і навичок); демонстраційно-моделювальні й імітаційні (для віртуального моделювання та імітування різноманітних процесів, явищ, ситуацій); ігрові (у яких гра використовується як форма й метод досягнення освітніх цілей); проблемного навчання (передбачають реалізацію навчально-пізнавальних завдань і непряме управління освітнім процесом); довідково-інформаційні (бази знань, електронні словники, енциклопедії, інформаційно-пошукові засоби тощо).

Основними напрямами використання ІКТ у педагогічній освіті є: електронне навчання (e-learning), дистанційне та змішане навчання, використання хмарних технологій, цифрових платформ управління навчанням (LMS), мультимедійних засобів, інтерактивних дошок, онлайн-тестування, віртуальних лабораторій та електронних бібліотек.

Перспективи подальшої наукової розробки означеної проблеми вбачаються в обґрунтуванні педагогічних умов ефективного використання інформаційно-комунікаційних технологій у професійній підготовці майбутніх учителів.

Ключові слова: *інформаційно-комунікаційні технології, майбутні вчителі, професійна підготовка, освітнє середовище.*