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THE USE OF MIND MAPS IN PRIMARY SCHOOL

The article is devoted to an actual problem – the use of mind maps, an innovative way of organizing information, in the educational process of an elementary school. The possibility of using mind maps in the educational process has been investigated. The relevance of using mind maps in today's conditions is described, the advantages of using this technology in educational institutions are analyzed. A review of the literature of foreign and Ukrainian scientists was made, a conclusion was made about the lack of research on mind maps as a means of intensifying the educational process in Ukrainian language classes in primary school. The method of using mind maps in native (Ukrainian) language lessons in the 3rd grade is described. The results of an experimental study are presented, the effectiveness of the proposed method using memory cards is proven. The study showed that the method of using mind maps in Ukrainian language lessons in primary school is useful, effective, and interesting. Mind maps make it possible to properly learn educational material in a concise verbal and figurative form, because they reflect the natural way of thinking of the human brain, correspond to the structure of human thinking (associative, visual, hierarchical). It was concluded that the use of mind maps in native language lessons in primary school contributes to the intensification of the educational process. The possibility of using mind maps for learning any language, as well as for other educational subjects, was noted. Prospective directions for the use of mind maps, in particular for teaching children with dyslexia, have been determined.

Keywords: *innovative technologies, intensification of educational process, language lessons, mind maps, primary school.*

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ВИКОРИСТАННЯ ІНТЕЛЕКТУАЛЬНИХ КАРТ У ПОЧАТКОВІЙ ШКОЛІ

*Статтю присвячено **актуальній** проблемі – використанню у навчальному процесі початкової школи ментальних карт – інноваційного способу організації інформації, засобу інтенсифікації навчального процесу. Досліджено можливості використання інтелектуальних карт в освітньому процесі. Описано актуальність використання ментальних карт в умовах сьогодення, проведено аналіз переваг використання цієї технології у навчальних закладах. Зроблено огляд літератури зарубіжних та українських науковців, зроблено висновок про відсутність досліджень інтелект-карт як засобу інтенсифікації навчального процесу на уроках української мови в початковій школі. **Мета** статті – описати методику використання ментальних карт, обґрунтувати актуальність їх використання як засобу інтенсифікації навчального процесу на уроках української мови в початковій школі. Про-*

ведено **експериментальне** дослідження, яке передбачало спостереження й аналіз роботи вчителів, анкетування з метою виявлення рівня сформованості знань про інтенсифікацію навчального процесу із застосуванням ментальних карт; діагностику рівня мовних знань учнів на уроках української мови з певних тем; вияв рівня сформованості учнівських умінь працювати з ментальними картами. Описано методику застосування інтелектуальних карт на уроках рідної (української) мови у 3 класі. Представлено **результати** експериментального дослідження, на основі яких доведено ефективність пропонованої методики із використанням карт пам'яті. Дослідження показало, що методика застосування інтелектуальних карт на уроках української мови в початковій школі є корисною, ефективною, цікавою. Карти мислення дають змогу у стислій словесно-образній формі якісно засвоювати навчальний матеріал, тому що вони відображають природний спосіб мислення людського мозку, відповідають структурі мислення людини (асоціативного, візуального, ієрархічного). Застосування інтелект-карт на уроках у початковій школі дає змогу зробити учнів активними учасниками навчального процесу. Використання інтелектуальних карт тренує пам'ять, підвищує концентрацію уваги, сприяє розвитку уяви і, найголовніше, сприяє формуванню вміння мислити творчо. Результати дослідження показали також, що застосування карт пам'яті значно підвищує зацікавленість учнів вивченням української мови. Практика показує, що процес творення ментальних карт є посильним для учнів з усіма типами сприйняття (візуальним, кінестетичним, аудіальним). Варто також зазначити, що учитель, який розробляє і використовує ментальні карти на уроках, повинен бути досить кваліфікованим. Зроблено висновок, що використання ментальних карт на уроках рідної мови в початковій школі сприяє інтенсифікації навчального процесу. Відзначено можливість застосування ментальних карт для вивчення будь-якої мови, а також і для інших навчальних предметів. Визначено перспективні напрями використання інтелектуальних карт, зокрема для навчання дітей з дислексією.

Ключові слова: інноваційні технології, інтенсифікація навчального процесу, інтелектуальні карти, уроки мови, початкова школа.

Political, economic and social changes in society are accelerating the reform of the education system that must respond flexibly to public demands. The World Declaration on Education provides for the basic educational needs of each individual, as well as the talent reveal and potential of each person in order to improve his or her own life and the life of society. Educational reforms in the European region include, above all, finding ways to improve the quality of education, including the implementation of new approaches to the organization of the educational process in educational institutions, innovative learning tools that would enhance it and stimulate students' desire to learn.

One of the main tasks of the modern education system is the intensification of the educational process. Scientists and teachers face the challenge of finding and implementing innovative forms and methods of teaching, and changing the procedural nature of the educational process, in which a special place is given to the involvement of students in cognitive activities, and achieving results through more effective use of mental abilities.

Nowadays, the use of mind maps serves as an effective tool for the intensification of the learning process. The term sounds different in the Ukrainian translation: ментальні карти (mental maps), карти пам'яті (memory maps), карти розуму (mind maps), карти мислення (thinking maps), карти думок (thought maps), асоціативні карти (associative maps). All these terms have a common meaning and are used interchangeably. What is the purpose of application of mind maps in the educational process? Visualization of the material through mind maps helps to trigger students' attention to the material studied, better assimilation of learning material, its memorization and reproduction, helps to solve creative tasks, make original decisions, organize information and more.

The problem of using mind maps in the educational process is studied by such scientists as brothers B. and T. Buzan, T. Vakaliuk, L. Vasylchuk, T. Vitko, S. Dotsenko, N. Zhydetska, M. Lavrenova, A. Naidionova, O. Nasypaiko, O. Mashkina, H. Mueller, N. Oksentiuk, N. Tereshchenko and others. It should be noted that the study of mind maps as a means of educational process intensifying in Ukrainian language lessons in primary school is absent.

The purpose of the article is to describe the methodology of using mind maps, to substantiate the relevance of their use as a means of the educational process intensifying in Ukrainian language lessons in primary school.

Political, economic and social changes in society are acceleratting the reform of the education system that must respond flexibly to public demands. The World Declaration on Education provides for the basic educational needs of each individual, as well as the talent reveal and potential of each person in order to improve his or her own life and the life of society. Educational reforms in the European region include, above all, finding ways to improve the quality of education, including the implementation of new approaches to the organization of the educational process in educational institutions, innovative learning tools that would enhance it and stimulate students' desire to learn.

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During some periods of educational development, an extensive (from the Latin extensivus – expanding) approach to the organization of education was natural and even necessary, which provided for the achievement of the desired results due to quantitative factors (increasing the duration of training and time to master disciplines). Today it is necessary to develop a style of pedagogical thinking focused on the intensity of learning. Intensification (derived from the Latin words intensión – tension, amplification and facio – I do) involves achievement of the desired results through qualitative factors. Solving this problem, according to scientists, requires the introduction of effective scientifically approved tools, methods and forms of leadership of educational and cognitive activities that mobilize the thinking and creative abilities of the learner [36].

An innovative approach in education as one of the ways to increase the efficiency of the educational process, is taking into account the way of thinking of the modern student, is the use of mind maps. A mind map is an effective way of organizing information, it is "a graphical expression of the process of radiant thinking and therefore a natural product of a brain" [4, p. 58]. Thus, the essence of the mind map is to use associative links to connect individual elements, placing them around the keyword. As noted by T. Buzan, this form is more understandable to perception: there is a multidimensional associative thinking, which allows you to see the object not by itself, but in relation to other objects [4, p. 54].

Porphyry of Tire is considered to be the first to apply the method of associative mapping in order to visualize the information when figuring out the concepts of Aristotle in the 1st century AD. Thorough modern developments in this direction date back to the 60s of the twentieth century. They related to the development of the theory of semantic networks in correlation to the study of human thinking in the learning process. It should be noted that quite complex diagrams were used to visualize the corresponding structures. It took some time for the mind maps to acquire their traditional format.

In modern scientific sources, mind maps were first mentioned in the works of D.P. Ausubel [2] and A.J. Canas & J.D. Novak [5], and these ideas were later popularized by T. Buzan. D. Ausubel laid the theoretical basis for the use of mind maps in the educational process, proving the importance of previous experience for understanding new ideas in his theory of assimilation [2]. D. Novak, borrowing the idea of the importance of previous experience for the formation of new concepts from D. Ausubel's theory, developed the basic rules for "Concept mapping" (a way of presenting and linking ideas). In the 1970s, Professor D. Novak began using mind maps as a means of the intensification of teaching Natural Science disciplines [5].

The famous English psychologist T. Buzan did a lot to promote the technology of mind maps in all spheres of life [4]. His methodology is based on the idea of the principles of the human brain: associative thinking, holistic perception, visualization of imaginary pictures. T. Buzan greatly simplified the technique of constructing mind maps, made them radial (which are built around some central thought, or problem). This technology was called Mind Mapping and introduced to the world in 1974 after the publication of his book "Work with your Head". T. Buzan and B. Buzan identified the characteristics and stages of the structure of a mind map [4, p. 58].

At the same time the technology of work with reference compendiums was offered and developed by V. Shatalov in Ukraine, which was then developed by his followers Y. Mezhenko and O. Liubymov. Back in the 80s of the last century, Honored Teacher of Ukraine V. Shatalov introduced the concept of "reference-graphic synopsis", which is aimed at using consistent, logical disclosure of the topic and the development of creative thinking of students [33, p. 32]. Over time, the method of reference graphics and the method of mind mapping began to use the same basic principles and be used to achieve the most important pedagogical goals.

Interest in the use of mind maps for educational purposes has grown significantly in recent decades. The use of mind maps in higher education institutions to improve the efficiency of the educational process has been studied by such foreign scholars as Miller, Doorn & O'Brien, Novak & Gowin, Horton, O'Donnell, Dansereau, Budd, Nesbit & Adescope and many others. For example, P. Farrand, H. Fearzana, and E. Hennessy have shown that mind maps not only promote the process of memorization, but also encourage students to a deeper level of learning, as they allow individualization of information perception [8]. Other scholars argue that maps can also be used as a means of display to make broader associations with material [15]. Mind maps can help students present prior knowledge in a broader conceptual form [14], can develop students' creative abilities [35], help students discuss problem situations and provide an opportunity to reflect on the learning process [30]. An attempt has been made to integrate problem situations and mind maps [11]. Mind maps are used to represent related concepts and ideas [6] using words, images, colours and branches. Mind maps created through digital technology [17; 35] are known as digital mind maps. These maps were created using technology

programs to brainstorm the presentation of ideas [9]. Digital mind maps can be used to facilitate learning [28; 34]. The use of digital learning can motivate students and make the learning process more interesting [19; 29]. It has also been shown that the integration of problem-based learning and digital mind maps helps to involve students in creative problem-solving [13; 24]. There are studies that have demonstrated that mind maps serve as an effective means of learning when applied to written material, specifically through their integration into descriptive writing activities with primary students [20, p. 321].

The possibilities of using mind maps in the educational process were also considered in the studies of scientists of the post-Soviet period. N. Oksentiuk emphasizes the effectiveness of the introduction of the method of mind maps in the teaching of humanities, in particular, psychology [25, p. 194]. A. Solodovnyk presents a significant role of mind maps as a tool for organizing independent work of students [37, p. 201]. A. Gordeeva identified the features of the use of mind maps for the formation of different types of foreign language communicative competence [10, p. 53], V. Mashkina features the use of mind maps in teaching geographical subjects [22], N. Prikhodko – in teaching foreign languages [27], N. Vasylkivska – in the training of future professionals in primary education [40], O. Aksonova found the use of mind maps in the process of forming effective economic thinking [1]. N. Tereshchenko emphasizes that mind maps are ideal for the use by teachers in universities, as they can be applied to any type of task that activates creative thinking of students [39, p. 145]. There are also studies by scientists [31; 38], which describe the possibilities of using cloud-based services to build intelligence maps in the professional activities of a teacher of freelance education.

The problem of incorporation of mind maps in practice at school is becoming increasingly important. Researchers L. Antroshchenko, S. Yemelyanova, N. Kuzmenko, O. Lytvynenko, A. Naidionova, T. Pozdnyakova, M. Cherniy and others played a significant role in the introduction of mind maps into the educational space of Ukraine. At the same time, it should be noted that the use of mind maps in primary schools has been only partially studied, and even less so in Ukrainian language lessons. The researchers S. Dotsenko, M. Lavrenova, U. Lutsanych, N. Kopnyak, T. Krupska, O. Mukoseenko, whose scientific interests result in development and implementation focus their attention on the types of mind maps and on-line services for their creation, and gives specific examples of the use of mind maps in reading lessons in primary school [18, p. 36]. O. Mukoseenko describes the method of using mind maps in the study of computer science by younger students, argues that drawing up mental maps in computer science lessons significantly increases students' interest in this course [23, p. 85]. S. Dotsenko considers the ways of developing the creative abilities of junior schoolchildren with the help of a mind map, describes the ways of using these cards in the educational process, in particular in mathematics lessons [7, p. 34]. N. Kopnyak and T. Krupska describe the ways to create original and cloud interactive multimedia mind maps, outline the benefits of using the Mindomo cloud service to develop mind maps in primary school [16, p. 151]. It should be noted that the method of using mind maps in primary school is insufficiently studied, almost no method of teaching younger students to independently create such maps.

The logic of our empirical study is based on the assumption that the use of mind maps in Ukrainian language lessons in primary school contributes to the intensification of the educational process.

In order to find out the current state of intensification of the educational process through the usage of mind maps in Ukrainian language lessons in primary school, an experiment has been conducted.

What was in the task?

− To analyze the work of teachers and interview them to identify the level of knowledge about the intensification of the educational process with the use of mind maps.

− To diagnose the level of language skills of students in Ukrainian language lessons on certain topics.

− To identify the level of formation of student skills to work with mind maps.

− To describe the method of using mind maps as a means of intensifying the educational process in Ukrainian language lessons in primary school.

− To experimentally test the effectiveness of the developed technique using mind maps.

The ascertaining stage of the research included the analysis of the linguistic, psychological and educational-methodical literature on the research problem; setting research tasks, carrying out ascertaining tests, and the analysis of their results. The observational experiment included: observation in Ukrainian language lessons in 3 classes, interviewing primary school teachers, written tests for students, which differed in content and structure depending on the research tasks.

Our observations in Ukrainian language lessons suggest that, despite the guidelines of standard educational programs for the intensification of the educational process, mind maps are almost never used for this purpose.

A significant percentage of the tasks used by teachers that could be visualized, structured in the form of mind maps, did not provide for such work.

A series of interviews with teachers has been conducted in order to establish in more detail how the educational process is intensified by primary school teachers and to find out the peculiarities of the use of mind maps in Ukrainian language lessons. Data from this survey were collected using a semi-structured interview method. According to L. Rupšienė, the purpose of the interview is to understand the experience of informants and an individual approach to the situation [32]. The survey data were recorded on a dictaphone, then analyzed with the help of qualitative content analysis. The principles of research ethics were followed during the research [3]. The participation of all respondents in the study was voluntary, and each of them agreed to use a dictaphone to record interviews. Participants were informed about the essence of the study, and that only generalized results of the study will be published. Respondents' confidentiality and data confidentiality were also ensured. The survey included 25 primary school teachers from the city of Ternopil (Ukraine).

The second stage of the study was a formative experiment, which involved the introduction of methods of using mind maps as a means of the educational process intensifying in Ukrainian language lessons. We conducted an experimental study during the academic year of 2022–2023 in Ternopil comprehensive school of I–III degrees No. 13 named after Andriy Yurkevich of Ternopil city council of Ternopil region. This study involved 47 students of the 3rd grade. Participants were divided into two groups: control and experimental. In the control class, training took place according to the current program and textbook, and in the experimental class – according to the research program with the additional use of specially composed didactic materials and methodological developments of lessons aimed at increasing the intensification of the educational process through the use of mind maps. The data obtained from the participants of the control group were compared with similar data obtained from the participants of the experimental group.

In order to achieve the goals of the research teaching, we used the method of creating mind maps at all types of Ukrainian language lessons, as well as at different stages of the lesson.

We tried to follow the relevant laws of creating mind maps and recommendations for their compilation, formulated by T. Buzan to make the mind mapping process as effective as possible. The author distinguishes the laws of content and design and the laws of structure in his work "Superthinking". In the laws of content and design, T. Buzan recommends the use of emphasis, to associate, to strive for clarity in the expression of opinion, to develop their own style. In the laws of structure, the scientist recommends to follow the hierarchy of opinions, to use the number sequence in the presentation of opinions. The recommendations highlighted by the author add to the laws of creating mind maps, in particular, provide for: removal of mental blockages, improvement of achievements, and preparation before working with mind maps [4, p. 95].

In our study, we used self-created mind maps, as well as created through various programs and resources. (For example, the tools of online services Mindomo, Popplet).

The work on the use of mind maps as a means of intensifying the educational process in Ukrainian language lessons in the 3rd grade was carried out in several stages: from observing the use of ready-made maps to creating them independently by students. Initially, we worked with fully filled maps, then practiced using partially filled maps with clear segments (empty cells, unnamed lines, etc.). And finally, students learned to make maps. Initially, this work was carried out collectively under the guidance of a teacher, then in groups, and then individually. We assume that this method of using mind maps contributes to the intensification of the educational process in Ukrainian language lessons in primary school, increasing the level of academic achievement of primary school students.

In order to determine the effectiveness of the experimental method at the final stage, control tests were performed. Students of control and experimental classes were offered the same diagnostic tasks, the results of which were compared. A qualitative and quantitative analysis of the study results was conducted.

One of the tasks of our research was to determine whether primary school teachers use the means of intensifying the educational process in Ukrainian language lessons. Teachers were asked about this during the interview, and it was clarified what tools teachers practice in order to intensify the learning process. Their answers were listed. 87% of surveyed teachers answered that they use such tools. Among the methods and techniques of intensifying learning, these teachers named interactive methods, information and communication technologies, role-playing games, non-standard tasks and more. When asked whether they practice the use of mind maps in Ukrainian language lessons, only 17% of teachers answered positively. And only 13% of teachers said that they use mind maps as a means of intensifying the learning process in Ukrainian language lessons. Teachers were asked to indicate during which types of lessons they had to use mind maps. It turned out that the maps were used only in the lessons of generalization and systematization of knowledge. Teachers were also asked to answer

questions about their experience in compiling mind maps: if they use ready-made mind maps or if they compose themselves. Only 7% of teachers answered that they draw up such maps on their own. And when asked whether they teach their students to draw mind maps, only 3% of teachers surveyed answered positively.

According to the analysis of the answers to the interview questions, most primary school teachers, realizing the importance of intensifying the educational process, have a superficial idea of mind maps as a means of intensifying it, and only a small number of teachers can draw such maps independently and teach their students. We see the reason for this in the insufficient development of methods for using mind maps as a means of intensifying the educational process in primary school lessons.

As part of the observational experiment, the students were given writing tests, which were provided to determine the level of language knowledge and skills of the 3rd grade students on the topic "Noun" in the traditional approach to learning, as well as to identify students' readiness to learn the suggested experimental material. Students of control and experimental classes showed a level of academic achievement that was almost the same in both groups (see Table 1).

Table 1

The results of the ascertaining stage of the study

Level of academic achievements	High		Sufficient		Average		Low	
Groups of subjects	CG (%)	EG (%)	CG (%)	EG (%)	CG (%)	EG (%)	CG (%)	EG (%)
Results of educational Achievements								
Students' achievement on the topic "Noun"	25.0	26.1	33.3	30.4	29.2	30.4	12.5	13.1
Ability to work with a mind map	12.5	13.1	29.2	26.1	41.7	43.5	16.7	17.4
Ability to create a mind map	8.4	8.7	20.8	17.4	33.3	34.8	37.5	39.1

Note: CG – control group, EG – experimental group

The results of the tests showed that students have mostly learned the theoretical information about the noun: they are able to recognize this part of speech among others, determine its categories, and use it in speech (over 56% of students showed a high and sufficient level of knowledge and relevant skills). It should also be noted that the level of readiness of students to work with mind maps, to create them in general is low (over 39% of third-graders showed a high and sufficient level of skills to work with mind maps, and the level of skills to create them is even lower – over 26% in high and sufficient level). But if we take into account the fact that work with mind maps in these classes is not conducted, then even a slight mastery of these skills allows students to conclude not only about the feasibility, but also about the possibility and accessibility of third-graders with mind maps, the use of these maps as a tool that enhances the learning process.

As part of the formative experiment, the method of using mind maps as a means of intensifying the educational process in Ukrainian language lessons was tested. The sources for the analysis of the results of our research were writing tests of students, which were performed at successive stages of research learning. Pupils of the 3rd grade were given theoretical and practical tasks, on the basis of which we determined quantitative indicators of the effectiveness of control tasks. For each completed task, a student received from 1 to 4 points: 4 points – completely correct answer, 3 points – incomplete correct, 2 points – partially correct, 1 point – incorrect. The result from 8.0 to 6.3 points was considered as the evidence of a high level of student achievement, from 6.0 to 4.3 – a sufficient level, from 4.0 to 2.3 – average, from 2.0 and below – low. The obtained results of tests after statistical processing are shown in table 2.

Table 2

The results of the control stage of the study

Level of academic achievements	**High**		**Sufficient**		**Average**		**Low**	
Groups of subjects	CG (%)	EG (%)	CG (%)	EG (%)	CG (%)	EG (%)	CG (%)	EG (%)
Results of educational Achievements								
Students' achievement on the topic "Noun"	29.2	39.1	37.5	47.8	25.0	8,.7	8.3	4.4
Ability to work with a mind-map	16.7	26.1	33.3	43.5	37.5	26.1	12.5	4.3
Ability to create a mind map	12.5	26.1	25.0	43.5	37.5	21.7	25.0	8.7

Note: CG – control group, EG – experimental group

The results of the control experiment show that the students of the experimental class, compared to the students of the control class, having the same time allotted to the curriculum, mastered a much larger amount of knowledge and skills on the topic "Noun". The indicators in Table 2 concerning the level of knowledge and skills of 3rd graders on the topic "Noun" show that in the experimental class the number of students who have acquired knowledge and skills at a level above average (high and sufficient together) is 20.2% higher than in the control class, which indicates the effectiveness of the use of mind maps as a means of intensifying the learning process in Ukrainian language lessons.

As shown by the results of comparative analysis, presented in Table 2, the level of skills to work with mind maps (to describe the Noun as a part of speech, using the map, insert the missing information about this part of speech, edit the map) of the students in the experimental class differs from those in control students. Thus, 39.1% of students in the experimental class (26.1%) and only 29.2% of students in the control class (25.0%) had a high level of skills to work with mind maps. 47.8% of students in the experimental class (30.4%) and only 37.5% of students in the control class (33.3%) had sufficient skills to work with mind maps. At the average level, 8.7% of students in the experimental class (30.4%) and 25.0% of students in the control class (29.2%) developed the ability to work with mind maps. At the initial level the skills respectively are formed in 4.4% of students in the experimental class (there was 13.1%) and only 8.3% of students in the control class (there was 12.5%). As it is seen, the level of formation of skills to work with mind maps in students of the experimental class is much higher than in students of the control class.

The levels of students' ability to create mind maps in Ukrainian language lessons are also presented in Table 2. The number of students in the experimental class who learned to create mind maps is much higher than in the control class. Thus, 26.1% of students in the experimental class (8.7) and only 12.5% of students in the control class (8.4) developed the ability to create mind maps at a high level. At a sufficient level – 43.5% of students in the experimental class (was 17.4) and only 25.0% of students in the control class (was 20.8). And accordingly, the number of students at the average and beginner level in the experimental class decreased compared to the control class. As you can see, the results of students in the experimental class are much higher than in students of the control class, which once again emphasizes the effectiveness of the use of mind maps as a means of intensifying the learning process in Ukrainian language lessons in primary school.

The study showed that the method of using mind maps in Ukrainian language lessons in primary school is effective, useful, and interesting. Mind maps allow us to learn the material in concise verbal and figurative forms, because they reflect the natural way of thinking of the human brain, correspond to the structure of human thinking (associative, visual, hierarchical). Mind maps help to create a holistic image of information – key concepts and relationships between them. A person has the opportunity to clearly see the process of thinking, and reflecting their thoughts on paper. The use of mind maps makes it possible to teach not only to think effectively, but also, as T. Pozdnyakova notes, to make adjustments to the thinking process, to "lay out ideas on the shelves". We support the scientist's opinion that due to a set of mental operations the structured educational material is brought into a certain system by means of signs-signals (symbolic, graphic, verbal), which allows to create visual support of interrelations of its structural elements [26, p. 6].

The use of mind maps in primary school lessons makes it possible to make students active participants in the learning process. Working with mind maps requires students to do their own research on language material and helps to get to the heart of a language phenomenon. According to N. Gavrysh, a person not only reproduces his or her own idea of the relationship of a key concept with others, but in some way realizes the logical sequence of search – orientation actions, i.e. better assimilates not only the knowledge itself, but also masters the methods of obtaining it [12, p. 38].

The use of mind maps trains memory, increases concentration, promotes the development of imagination and – most importantly – promotes the formation of the ability to think creatively. This can be explained by the fact that mind maps involve both hemispheres of the human brain in a balanced work. We also observed that students try to create their own unique maps, trying to move away from the specific rules of their creation. This conclusion is consistent with the statement of T. Buzan that, by developing their own style, a person can change the principles of creating maps, the main thing is to make thinking more productive. After all, mind maps were invented for this purpose [4, p. 94].

The results of the study also showed that the use of mind maps significantly increases students' interest in learning the Ukrainian language. We can conclude that such maps can and should be used in the study of other subjects to motivate students. It is worth noting that students' interest in compiling mind maps does not depend on the level of their academic achievement. This conclusion is consistent with the conclusion formulated by O. Mukoseenko [23, p. 91].

Practice shows that the process of creating mind maps is feasible for students with all types of perception (visual, kinesthetic, audio). It is also worth noting that a teacher who develops and uses mind maps in lessons must be sufficiently qualified.

The results of our study confirmed the effectiveness of the proposed method and the feasibility of its use: students in the experimental class have much better academic achievement than students in the control class. Thus, we can state that the use of mind maps in Ukrainian language lessons in primary school contributes to the intensification of the educational process. The results of the research can be useful for learning any language, as well as for other subjects studied in primary school, improving the quality of their mastery and outlining new areas of investigation. For further research, it is recommended to consider the possibility of studying mind maps in inclusive education, in particular for teaching children with dyslexia.

REFERENCES

1. Aksyonova, O.V. (2005). Experience of using the method of mind maps in economic education. *Improving the content and forms of organization of the educational process in accordance with international standards:* Coll. Scientific method. conf. February 2–4, 2005. Vol. 1. Kyiv: KNEU, 3–7. Retrieved from: https://ir.kneu.edu.ua:443/handle/2010/13513.

2. Ausubel, D.P. (1968). *Educational Psychology: A Cognitive View*. Rinehart and Winston.

3. Bitinas, B., Rupšienė, L., & Žydžiūnaitė, V. (2008). *Kokybinių tyrimų metodologija.* Vilnius: Socialinių mokslų kolegija.

4. Buzan, T., & Buzan, B. (2003). *Superthinking* (2nd ed.). Medley.

5. Canas, A.J., & Novak, J.D. (2006). Re-examining the foundations for effective use of concept maps. *Second Int. Conference on Concept Mapping.* Costa Rica: San Jose. Retrieved from: http://cmc.ihmc.us/cmc2006Papers/cmc2006-p247.pdf.

6. Cuthell, J. & Preston, C. (2008). Multimodal Concept Mapping in teaching and learning: a MirandaNet Fellowship project. In K. McFerrin, R. Weber, R. Carlsen & D. Willis (Eds.). *Proceedings of SITE 2008 – Society for Information Technology & Teacher Education International Conference* (pp. 1999–2007). Las Vegas, Nevada, USA: Association for the Advancement of Computing in Education (AACE). Retrieved June 16, 2022 from: https://www.learntechlib.org/primary/p/27493/.

7. Dotsenko, S.O. (2017). Development of creative activity of primary school students: the use of mind maps. *Word science: international scientific and practical conf. Top Actual Researches in Modern Science: Proceedings of the III International Scientific and Practical Conference,* Ajman, UAE, July 31, 2017. Ajman: WORLD Science. 8 (24), Vol. 4, 30–35. Retrieved from: https://dspace.hnpu.edu.ua/handle/123456789/2140.

8. Farrand, P., Fearzana, H., & Hennessy, E. (2002). The efficacy of the "mindmap" study technique. *Medical Education*, 36, 426–431.

9. Faste, H., & Lin, H. (2012). The Untapped Promise of Digital Mind Maps. *In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 1017–1026). ACM. DOI: https://doi.org/10.1145/2207676.2208548.

10. Gordeeva, A.Y. (2012). Intellectual maps as a means of forming foreign language communicative competence of future philologists. *Foreign languages*, 4(72), 51–58. Retrieved from: http://www.irbis-nbuv.gov.ua/cgi-bin/irbis_nbuv/cgiirbis_64.exe?I21DBN=LINK&P21DBN=UJRN&   Z21ID=&S21REF=10&S21CNR=20&S21STN=1&S21FMT=ASP_meta&C21COM=S&2_S21P03=FILA=&2_S21STR=im_4_801.

11. Hariyadi, S., Corebima, A.D., & Zubaidah, S. (2018). The Contribution of Mind Mapping, Summarizing and Questioning in the RQA Learning Model to Genetic Learning Outcomes. *Journal of Turkish Science Education (TUSED)*, 15(1), 80–88. DOI: https://doi.org/10.12973/tused.10222a.

12. Havrysh, N.V. (2007). *Integrated classes: conducting method.* School world. Retrieved from: https://elibrary.kubg.edu.ua/10273/1/N_Gavrish_integrovani_zaniatia_metodika_provedenia.pdf.

13. Hidayati, N., Zubaidah, S., Suarsini, E., & Praherdhiono, H. (2019). The Integrated PBL-DMM: A Learning Model to Enhance Student Creativity. *Pedagogika*, *135*(3), 163–184. DOI: https://doi.org/10.15823/p.2019.135.9.

14. Johnstone, A.H., & Otis, K.H. (2006). Concept Mapping in Problem based Learning: A Cautionary Tale Concept Mapping in Problem based Learning: a Cautionary Tale. *Chemistry Education Research and Practice*, 7(2), 84–95. DOI: http://dx.doi.org/10.1039/B5RP90017D.

15. Jones, B.D., Ruff, C., Snyder, J.D., Petrich, B. & Koonce, C. (2012). The effects of mind mapping activities on students' motivation. *International Journal for the scholarship of teaching and learning*, 6 (1), 1–21. DOI: https://doi.org/10.20429/ijsotl.2012.060105.

16. Kopniak, N.B., & Krupska, T.O. (2019). Mind maps as a means of visualizing educational material in primary school. *Young scientist*, 5.2 (69.2), 148–153. Retrieved from: http://molodyvcheny.in.ua/files/journal/2019/5.2/33.pdf.

17. Laampere, M., Matsak, E., & Kippar, J. (2006). Integrating a Concept Mapping Tool into a Virtual Learning Environment: Pedagogical and Technological Challenges. *In Concept maps: Theory, methodology, technology: Proceedings of the Second International Conference on Concept Mapping* 1, 280–287. Retrieved from: http://cmc.ihmc.us/cmc2006Papers/cmc2006-p78.pdf.

18. Lavrenova, M.V. (2019). Mental maps as innovations in the educational process. *Scientific Bulletin of Mukachevo State University. Series "Pedagogy and Psychology"*, 1(9), 36–40. Retrieved from: http://nbuv.gov.ua/UJRN/nvmdupp_2019_1_9.

19. Lebeničnik, M., Pitt, I., & Starčič, A.I. (2015). Use of Online Learning Resources in the Development of Learning Environments at the Intersection of Formal and Informal Learning: The student as autonomous designer. *Center for Educational Policy Studies Journal*, 5(2), 95–113. DOI: http://dx.doi.org/10.26529/cepsj.144.

20. Le, Lan-Anh & Le, Nga & Ngo, Lan-Anh & Tran, Quynh-Nga. (2023). The Use of Mind Mapping Technique in Descriptive Writing among Primary School Students. *Journal of Educational and Social Research,* 13(4), 321–330. DOI: https://doi.org/10.36941/jesr-2023-0112.

21. Lutsanych, U.V. (2017). Using mental maps in primary school lessons. *Education and the formation of competitiveness of specialists in the conditions of European integration: a collection of abstracts of reports based on the materials of the International Scientific and Practical Conference,* October 26–27, 2017, 232–234. Retrieved from: http://dspace.msu.edu.ua:8080/jspui/handle/123456789/5630.

22. Mashkina, V.V. (2011). The use of mental maps in the training of geography specialists. *Problems of continuous geographic education and cartography*, 13, 62–64. Retrieved from:http://nbuv.gov.ua/UJRN/Pbgo_2011_13_21.

23. Mukoseenko, O.A. (2015). Memory cards as a means of increasing interest in informatics. *Bulletin of the Chernihiv State Pedagogical University named after T.G. Shevchenko. Series: Pedagogical Sciences*, 125, 85–92.

24. Noonan, M. (2013). Mind maps: Enhancing Midwifery Education. *Nurse education today*, 33(8), 847–852. DOI: https://doi.org/10.1016/j.nedt.2012.02.003.

25. Oksentiuk, N.V. (2015). Possibilities of using mental maps in the educational process. *Learning technologies: a scientific and methodological collection.* Rivne: NUWENU, 15, 194–208. Retrieved from: http://ep3.nuwm.edu.ua/id/eprint/3668.

26. Pozdniakova, T.E. (2018). *Visualization and structuring of information using mental maps in biology classes: scientific and methodological manual.* ROIPPO. Retrieved from: http://umo.edu.ua/images/content/depozitar/posibnyky/i/4_%D0%9F%D0%BE%D0%B7%D0%B4%D0%BD%D1%8F%D0%BA%D0%BE%D0%B2%D0%B0___%D0%92i%D0%B7%D1%83%D0%B0%D0%BBi%D0%B7%D0%B0%D1%86i%D1%8F.pdf.

27. Prykhodko, N.G. (2014). Mind mapping technology in teaching foreign languages. In M.M. Havrysh et al. (Eds.). *Creative potential of language departments in the innovative development of a research university*: coll. of materials of interdept. science and method conference, February 18, 2014, Ministry of Education and Science of Ukraine, State Higher Education Institution "Kyiv V. Hetman National Economic University". Kyiv: KNEU, 37–39. Retrieved from: https://ir.kneu.edu.ua:443/handle/2010/11030.

28. Pumahapinyo, S., & Suwannatthachote, S. (2014). Factors Affecting the Innovation-Decision Process to Adopt Online Graduate Degree Program in Thailand. *In the Proceedings of International e-Learning Conference,* Bangkok, Thailand.

29. Qi, A. (2018). A Study of the Effect of Implementing Intellectual Property Education with Digital Teaching on Learning Motivation and Achievements. *Eurasia Journal of Mathematics, Science & Technology Education*, 14(6), 2445–2452. DOI: https://doi.org/doi.org/10.29333/ejmste/89498.

30. Ravindranath, S., Abrew, W.K. De, & Nadarajah, V.D. (2016). Student's perception of mind mapping in Problem-based learning. *Journal of Contemporary Medical Education*, 4(2), 60–66. DOI: https://doi.org/10.5455/jcme.20160620013341.

31. Rudenko, N. (2020). Peculiarities of training future primary school teachers to use mental maps in mathematics classes, *OD*, 2 (29), 92–104. DOI: https://doi.org/10.28925/2312-5829.2020.2.8.

32. Rupšienė, L. (2007). *Kokybinio tyrimo duomenų rinkimo metodologija*. Klaipėda: Klaipėdos universiteto leidykla. Retrieved from: https://epale.ec.europa.eu/sites/default/files/kokybiniu_tyrimu_duomenu_rinkimo_metodol.pdf.

33. Shatalov, V.F. (1987). *A Point of Support*. Pedagogy.

34. Simándi, S. (2018). Lifelong Learning and Web 2.0 Tools: Online Study Circles for Supporting Active Learning and Citizenship. *Pedagogika*, 131(3), 67–82. DOI: http://dx.doi.org/10.15823/p.2018.34.

35. Siwczuk, E. (2005). Mind Maps a Creative Thinking Tool. *Technical Sciences*, (8), 313–326. Retrieved from: http://www.uwm.edu.pl/wnt/technicalsc/ts8_2005/25_8_2005.pdf.

36. Slepkan, Z.I. (2005). *Scientific foundations of the pedagogical process in higher education: a study guide*. High school.

37. Solodovnyk, A.O. (2012). Mind-mapping as a tool for organizing the independent work of physics cadets. *Information technologies in education,* Kherson State University, 12, 201–205. Retrieved from: http://nbuv.gov.ua/UJRN/itvo_2012_12_32.

38. Spirin, O.M., Vakalyuk, T.A. (2018). Cloud-oriented intellectual maps as a means of informational and analytical support for the teacher's professional activity. *Scientific Notes of Berdyansk State Pedagogical University. Series: Pedagogical Sciences*, 1, 227–234. Retrieved from: http://eprints.zu.edu.ua/id/eprint/28663.

39. Tereshchenko, N.V. (2012). Intelligence maps as modern innovative social learning technologies in the education system. *Functional economy. Scientific Notes*, 14, 139–145. Retrieved from: https://ir.kneu.edu.ua/handle/2010/2207.

40. Vasylkivska N.A. (2021). The use of mental maps in the training of future specialists of primary education. *Strategic directions of the development of modern Ukrainian language didactics: monograph /* edited by E. Palykhata, O. Petryshyna. Ternopil: Pidruchnyky and posibnyky, 2021. 352 p.