SCTCMG 2021
International Scientific Conference «Social and Cultural Transformations in the Context of Modern Globalism»

MIND MAPPING TECHNOLOGY AS A REAL REQUEST OF A MODERN SCHOOL

Natalia Anatolievna Savotina (a)*, Maria Valerievna Reimer (b),
Galina Vladimirovna Zavada (c), Anastasia Sergeevna Kyvyrzhik (d)
*Corresponding author

(a) Kaluga State University n.a. K.E. Tsiolkovsky, 26, Razin str., Kaluga, Russia, m.casatkina2011@yandex.ru
(b) Kaluga State University n.a. K.E. Tsiolkovsky, 26, Razin str., Kaluga, Russia
(c) Kazan State Power Engineering University
(d) Kaluga State University n.a. K.E. Tsiolkovsky, 26, Razin str., Kaluga, Russia

Abstract

The article shows that the mind map technology meets the needs of a modern school, solves new educational standard tasks and develops creative thinking skills in schoolchildren. Mind maps are described, features of application of this technology in secondary schools are analyzed, and its effectiveness is tested in history lessons. The key theoretical characteristics of the technology and the concept of mind maps are presented; an analysis of the influence of mind maps on cognitive universal educational actions of students is carried out. The article describes the results of a pedagogical experiment on the development of cognitive thinking skills by means of mind maps. The use of mind maps in history lessons activates the mental activity, contributes to the development of critical thinking skills and increases the overall efficiency of memorizing information by enhancing the creative abilities of students. Among the advantages of mind maps is the use of the entire spectrum of brain activities (operating with words, images and numbers, logic, rhythm, color and spatial orientation, providing the freedom of arbitrary application of mental capabilities) and the ability to identify missing information to pose a problem question, track relationships and interdependencies. Among the disadvantages are the need for training for their effective use and overcoming the psychological load in case of misunderstanding of the educational task; insufficient scalability to reflect complex, multi-stage processes, the risk of overloading the mind map with information, the likelihood of generating false associations.

Keywords: Mind map, tree diagram, radial branches

1. Introduction

The life of a modern school is characterized by great changes: traditional forms of education are being revised, curricula are being changed, alternative programs and textbooks are being introduced, new teaching technologies are being implemented. Such transformations are natural conditions for the new generation of the Federal State Educational Standard. The traditional knowledge approach cannot cope with these requirements and is replaced by a competence-based approach, whose range of tasks expands from the involvement of the student in educational activities, independent mastering of new knowledge to the application of knowledge gained in solving cognitive, educational, practical, and personal problems. In his work "Education as a culture of personality", the famous Russian philosopher and teacher Gessen (2003) writes that the task of teaching is not to make a person smarter, but to make his mind more cultured, to ennoble him ... by instilling in him the method of scientific knowledge. It is a mind that has absorbed a scientific culture, able to subordinate the arbitrariness of its thinking to objective requirements.

According to the Federal State Educational Standard, the subject results are basic knowledge and development of civic self-identification and developed skills in searching, analyzing, comparing and evaluating information. In this regard, technologies play a significant role in the learning process to help children develop critical thinking skills. The abilities to compare, analyze and draw conclusions are inextricably linked with imagination: like thinking, imagination arises in a problem situation, is motivated by the needs and determined by the level of consciousness. Emphasizing the interdependence between thinking and imagination, Ushinsky argued that a strong, active imagination is an attribute of the great mind (as cited in Sidorov & Parnyakov, 2000).

2. Problem Statement

The main objectives of the study are as follows: key theoretical characteristics of technology and the history of mind maps; the influence of mind maps on cognitive universal educational actions of students; results of the pedagogical experiment on the development of cognitive UEA by means of mind maps.

The mind map is a special visualized tree diagram, which is used to organize and record information with associations, concepts, pictures and words that facilitate the process of memorizing and analyzing information. Unlike linear recording methods, the mind map is not designed for a large amount of texts or sentences, but for the use of color images, keywords, signs and symbols. The prototypes of mind maps are found in the works by ancient philosophers: the earliest graphical representation of complex information was proposed by Porfiry of Tyros (3rd century AD), who streamlined the concept of categories in Aristotle's philosophy. The method of recording new material, in which thoughts, ideas or facts are located around a central concept so that everyone can get a versatile idea about it, was developed by Tony Buzan in the late 1960s as an effective method for generating ideas through associations. The main provisions of the concept were first presented in the book "Use Your Head" (1974). This book formed the basis for "The mind map book" (1993), written by Barry Buzan. Buzan (2007) created his own mind mapping support software called MindMap in December 2006. Today, more than 200 computer

programs have been developed to create mind maps. The mind map offers the easiest and most effective way to put information in the brain and extract it from there, and is associated with an inseparable part of human nature (Buzan, 2007).

In Russia, the technology of mind maps is being studied by Bershadsky (2021). The theoretical issues of this technology are descried by Bershadsky (2021).

Scientists agree that mind maps are hierarchical and show relationships between elements of the same topic: they are organized and consistent. The creation of mind maps begins with a picture of the main concept in the middle of a blank page, and then additional branches are attached to this central concept, which also contain keywords, concepts and associations.

3. Research Questions

Imagination relies on personal images, ideas and associations, the ability of the human brain to memorize which is much higher than to assimilate concepts (Vorobyeva & Budunova, 2013). The teacher should develop creative abilities in students and involve their resources in the educational process, thanks to which the assimilation of new knowledge becomes much more effective and exciting. The mind mapping technology is an indispensable tool for lucid note-taking, as one of these technologies that stimulates the creative process, develops planning, annotation and analysis skills. It allows you to quickly and visually organize or plan educational activities, make notes, memorize and organize voluminous information. The mind mapping technology is a technology for displaying information in a graphical form; it allows you to structure information, creatively think.

The use of accents in creating mind maps contributes to the effective memorization of information. It is advisable to give the branches natural curves in order to make them more attractive, as well as try to make them unique in size, color, volume and design – in this way the information will be memorized better. For example, students can make the main branches thicker or depict them in the form of a subject that is related to the topic under study, or graphically highlight the most important words using fonts, colors and text size (Markov, 2019).

The use of different colors makes them much more interesting to view and remember information that they contain. For high school students, working with color is an element of psychological relief, making the learning process pleasant and exciting, which stimulates mental activity, because the right hemisphere of the brain is usually responsible for the perception of different colors.

Drawings, symbols, icons and doodles stimulate associative thinking, help visualize a topic and keep it in memory for a longer period. They are an integral part of mind maps. However, students should avoid over-painting, as they may miss important content.

Visual symbols – icons – add clarity to the contextual meaning and are much more quickly recognized by the brain. You can use check marks, crosses, circles, triangles or more detailed and descriptive symbols (Fig. 01).

Figure 1. The sample of the mind map

Information located on one sheet in a form that is sufficient for understanding and memorization. Experiments conducted by scientists as part of studying the possibilities and effectiveness of mind maps showed that even students who did not succeed in the program felt their involvement in the topic under study due to the fact that they had a holistic picture of events supported by their own associations (Dhiyauddin, 2018).

In addition, mind maps force students to plan their thought process on paper, thereby contributing to the development of their practical skills and abilities. They can be created both with the help of special graphic editors, and with the help of pens, colored pencils or felt-tip pens. In history lessons, we have only student notebooks, which do not way affect the effectiveness of application of this technology. In the context of distance learning and as a homework assignment, children can be offered the task of drawing up mind maps using one of the popular services: "Mindmeister", "Mindomo" or "Mind42" (Samokhina, 2016).

4. Purpose of the Study

The purpose is to show the effectiveness of the mind mapping technology to improve the cognitive activity, develop cognitive universal educational actions and creative abilities in history lessons. Using the example of one of the topics studied in history lessons, we analyzed the quality of final assimilation of knowledge in two cases: drawing up mind maps in notebooks, using the information given by the teacher and the textbook materials; writing a traditional synopsis of the new topic.

5. Research Methods

The method for assessing the effectiveness of knowledge assimilation was test results. In order to compare results of both groups and within one group, when using the mind mapping technology, we compared the previous test results.

Before the experiment, we had the following results in "A" group: out of 25 people, only 6 students received "5" (24 %), 9 – "4" (36 %), 5 – "3" (20 %), and the remaining 5 students did not cope with the task (20 %). As a result, the overall success of "A" group was 80 %.

The same testing of "B" group showed the following results: 8 out of 27 students received "5" (30 %), 12 – "4" (44 %), 4 – "3" (15 %) 3 (11 %) – did not succeed. The overall performance of "B" group was 89 % (Fig. 02).

As the topic of the experimental lesson, we chose "Greek culture of the classical era", which corresponds to one of the textbook chapters edited by Ukolova (2019). This lesson was designed for the independent work of 5th grade students, which was preceded by a five-minute explanation, which included: announcement of the topic, general acquaintance with its content, focusing the attention of students on the issues they will learn, detailed advice on how to do it yourself.

At the beginning of the lesson, 5 "A" group was asked to draw up a mind map using pens and colored pencils, and 5 "B" group worked in the usual format. In both cases, 40 minutes were spent on studying the topic at school. 17 students of 5 "A" group managed to complete their work, five students revised 3 out of 4 presented blocks of information, and four students managed to add only two sections to the map. Thus, 36 % of the students continued with mind mapping at home. 5 "B" students worked with the teacher and managed to make a synopsis of the materials of three sections.

In the next lesson, the children of both groups were offered a test on the topic under study.

The results in 5 "A" group were as follows: 8 students received "5" (32 %), 11 – "4" (44 %), 4 – "3" (16 %), and 2 – did not cope with the test (8 %). The overall percentage of performance was 92 %.

5 "B" group coped with the test as follows: 9 students received "5" (33 %), 10 – "4" (37 %), 5 – "3" (19 %), and 3 – "2" (11 %). 89 % of students successfully completed the tasks (Fig. 03).

Summing up, the qualitative indicator of success in 5 "A" group increased by 12 %, while the percentage in 5 "B" group did not change (Fig. 04). The number of students and their personnel did not change over the entire experimental period.
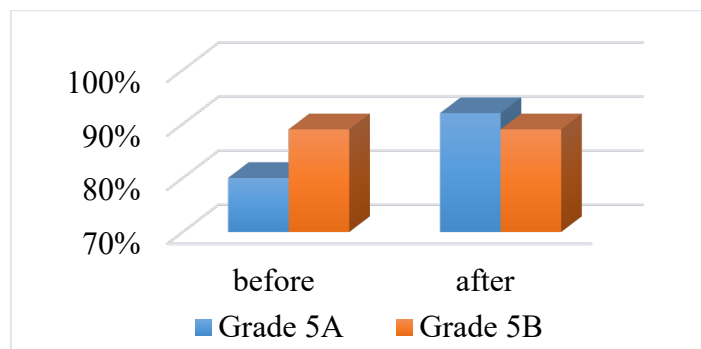
Figure 2. Comparative performance indicators in grades A and B before and after the experiment
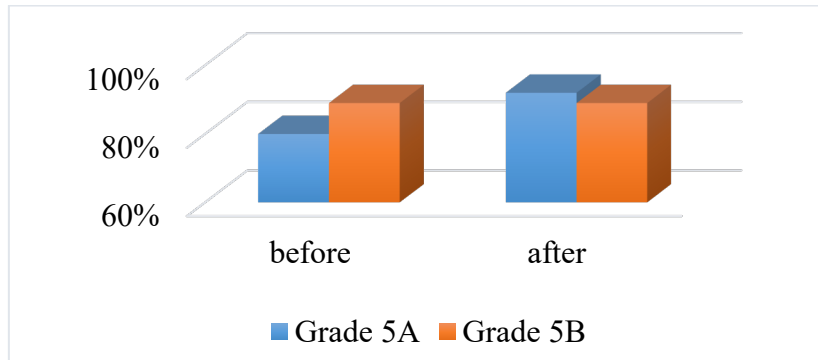
Figure 3. Comparative performance indicators in grades A and B before and after the experiment
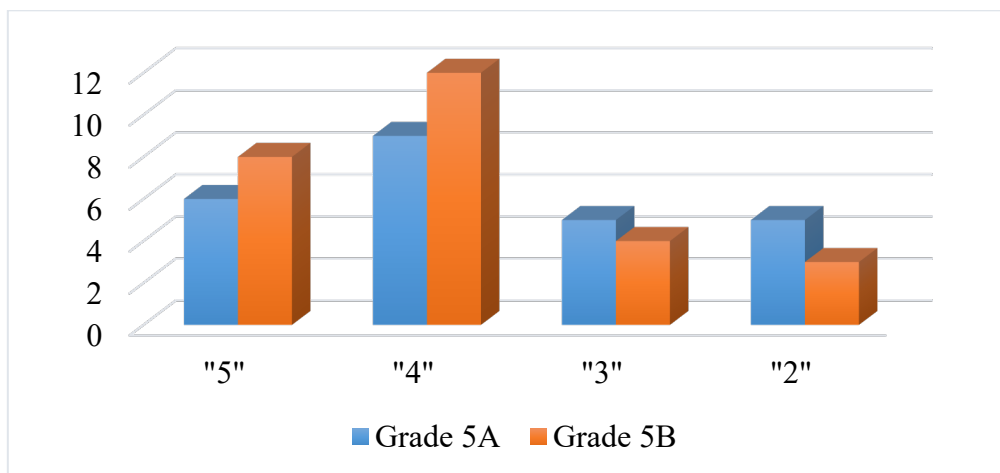
Figure 4. Comparative indicators of testing work in A and B grades before the experiment

6. Findings

The experiment has proved the efficiency of using the mind mapping technology in history lessons. The maps reflect the natural radian way of thinking, which is the basis of their effectiveness; the use of the entire spectrum of brain activity – operating with words, images and numbers, logic, rhythm, color and spatial orientation – provides the freedom of arbitrary application of unlimited possibilities embedded in the brain of every person.

Mind maps are useful when students should find missing information to formulate a problematic question, tracking the relationships and interdependencies of several phenomena or concepts.

7. Conclusion

This method stimulates creative and critical thinking abilities, helps students to more easily perceive and memorize information, improves memory, clarity and efficiency of thinking, general intelligence and quickness of thought by mobilizing the latent cognitive abilities. The disadvantage of

mind maps is the need for careful training, since when creating the first mind maps, students may experience psychological stress and do not fully understand what is required.

It is also worth noting the insufficient scalability of mind maps to reflect complex, multi-stage processes, when it is impossible to fit all the information on a sheet of paper. However, if the necessary space is available, there is a risk of overloading the mind map with information.

Associations can be subjective, they often depend on changing internal and external conditions, and therefore there is a possibility of generating false associations that lead away from the problem. For these reasons, it is necessary for the teacher to carefully think through the tasks using mind maps.

Taking into account the advantages and disadvantages, the mind mapping technology meets the needs of a modern school and solves the tasks of the new educational standard.

References

Bershadsky, M.E. (2021). *Mind mapping method.* http://bershadskiy.ru/

Buzan, T. (2007). *Memory cards: use your memory 100 %.* Rosman.

Dhiyauddin, A. S., Ahmad, S. M., & Ismail, M. (2018). Mind mapping Approach in Learning History. *International Journal of Engineering & Technology, 7*(3.15), 59–62.

Gessen, S. I. (2003). *Education as a culture of personality.* http://kniga.lib-i.ru/26psihologiya/530011-1-uchebno-poznavatelnie-kompetencii-zadacha-obucheniya-zaklyuchaetsya-tom-chtobi-sdelat-cheloveka-umnee-tom-chtob .php

Markov, S. (2019). *Mind mapping (Mind maps) as a method for analyzing complex situations and creative problem solving.* https://geniusrevive.com/majnd-mepping-intellekt-karty-sushhnost-pravila-i-etapy/

Samokhina, V. M. (2016). The use of mind maps in training. *Young Scientist, 29*(133), 598–600.

Sidorov, P. I., & Parnyakov, A.V. (2000). *Introduction to Clinical Psychology* (Vol. I). Textbook for students of medical universities. Business book.

Ukolova, V. I. (2019). *General history. Ancient world. Grade 5*. Textbook for educational organizations. Enlightenment.

Vorobyeva, V. M., & Budunova, L. G. (2013). *Effective use of the mind maps method in the classroom. Methodological guide*. GBOU "TemoCenter".