

On The Issue Of Organizing Synthesized Learning For Students

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Abstract:

Background / Relevance. An increase in the cognitive activity of students, the quality and degree of assimilation of educational material by them is facilitated by the use of individually oriented innovative technologies and teaching methods in the process of training sessions. These teaching methods and technologies are based on taking into account the characteristics of the functional interhemispheric asymmetry of the brain of trainees. This approach helps to improve the effectiveness and quality of students' activities in the educational, creative and professional fields.

Methods. Diagnostics of the dominant hemisphere, thinking strategy and speech style of students was carried out using the "Style of Learning and Thinking" (SOLAT) method, authored by Ellis Paul Torrance in collaboration with C.R. Reynolds, T. Riegel, O. E. Ball. To determine the progress of students, electronic journals of academic groups were studied. The modified version of the synthesized teaching method developed by us was tested experimentally.

Results. Application in the educational process of a modified version of the synthesized teaching method based on taking into account the features of the interhemispheric functional asymmetry of the brain of the trainees. Teachers' compliance with a number of didactic conditions in the process of organizing and conducting training sessions contributed to the increase of cognitive activity, the development of intellectual and creative abilities of students. The use of a synthesized teaching method based on the universal principle of organizing the activity of the cerebral hemispheres when explaining new educational material optimizes the process of learning educational information, regardless of the fact that students have different memory systems and thinking strategies.

Conclusions. Effective development of creative thinking in the classroom is possible with the use of techniques aimed at improving the right-hemisphere method of processing information, which do not exclude, but imply the development of a left-hemisphere method interacting with it in a complementary way. The interaction of both hemispheres in the classroom is based on the development of holistic perception, imaginative memory, imagination, imaginative comparison and the ability to shift the attention zone. This approach to the organization of the educational process has a positive effect on increasing the cognitive activity of students, as well as on the development of their intellectual and creative abilities.

Key words: functional interhemispheric asymmetry, lateration profile, synthesized teaching method, peculiarities of thinking, dominant hemisphere, preferred representative system.

Introduction.

The development and prospects of the society depend on how developed the field of education is. Therefore, representatives of the education sector in our republic are entrusted with the tasks of striving for knowledge, spiritual and moral purification, further development of human qualities such as faith, honesty, religion, honor, kindness, and ensuring that they grow physically and mentally healthy. **Error! Reference source not found.**

The President of the Republic of Uzbekistan, Sh.M. Mirziyoev, emphasized this issue and said, "... The most important task of the government, relevant ministries and agencies, and the entire educational

system, ... professors and teachers is to provide a thorough education to the young generation, make them physically and spiritually "It is to educate mature people". **Error! Reference source not found.**

The effective solution of this problem, in many ways, requires coaches and pedagogues to have comprehensive and in-depth knowledge of the learner's personality in the process of education and upbringing, to take into account their psychophysiological characteristics and individual characteristics from the early student period.

Materials and methods.

In scientific research in the field of neuroscience (I.P. Pavlov, A.R. Luria, L.S. Vygotsky, Michael S. Gazzaniga, Randell C. O'Reilly, Yuko Munakata, Paul Harris, etc.) , it has been determined that they differ from each other in terms of their portability, the speed of receiving and assimilating information, imagining and understanding existence, and "seeing the world". This situation is related to which of the hemispheres of the brain is of leading importance in the activities of human life. Therefore, teaching taking into account the individuality of students in the educational process is one of the important factors in the full mastery of educational materials. For this, it is necessary to direct the teaching process to the individuality of the students.

Steven M. Platek, Julian Paul Keenan, Todd K. Shackelford, V.A. Moskvina, N.V. Moskvina, E.D. Khomskaya, N.N. Bragina, T.A. Dobrokhova scientific research on the cognitive aspects of the cerebral hemispheres dedicated to learning. In particular, as noted by S.M. Platek, J.P. Keenan and T.K. Shackelford, any information received by a living organism can first be adapted, then assimilated, and only then returned to the outside in the form of behavior, various physiological behaviors or psychological mechanisms. The research and study of processes in the human brain related to language, memory and consciousness is very important and complex. Because higher-order cognitive abilities and their structure, such as language, memory, and consciousness, along with lying, abstract thinking, and action planning, various problems arise. At the same time, the brain and some related systems are still not fully understood. Because the process of studying and determining the functions of the brain is being carried out extremely slowly. Human behavior cannot be studied separately from its biology. Behavior is a form of biology. **Error! Reference source not found.**

N.N. Nikolaenko says that the functional asymmetry of the cerebral hemispheres is not global, but partial in nature. Man perceives existence using two different sign models. Directly isomorphic, emotional perception of existence is based on the system of iconic symbols, the mechanisms of which are concentrated in the right hemispheres. The reflection of existence in concepts is based on the logical analysis of emotional perceptions and relies on the system of symbolic symbols. These mechanisms are concentrated in the left hemispheres of the human brain. The participation and importance of the hemispheres in the implementation of human psychic functions are not the same, but different. Usually, in human activity, one of the right and left hemispheres is dominant over the other. **Error! Reference source not found.**

Knowing the structure and organization of the human brain allows for a comprehensive study of its processes of remembering, perceiving, acquiring and understanding information. From the point of view of the organization of the activity of the brain, the quality of knowledge acquisition depends not only on the level of development of the student's intellect, but also on the teacher's presentation of educational materials taking into account the characteristics of students' strategies for understanding existence, receiving information, assimilation and understanding. Randall C. O'Reilly, Yuko Munakata [9], A.T. Kuzmina [10], M.P. Karpenko [11], Paul Harris [22] scientific studies.

In order for the pedagogue-teacher to solve the educational and developmental tasks of the lesson taking into account the individual characteristics of higher mental functions in the activity of the brain of students, firstly - certain knowledge about the brain's mechanisms of information acquisition, its correlation with gender differences, thinking strategies and the peculiarities of representative systems, and, secondly - we believe that the student should have the skills to apply teaching methods focused on individuality. **Error! Reference source not found. Error! Reference source not found.**

There is a contradiction between the fact that the time for passing each educational topic is strictly limited during the lesson and, on the other hand, the process of assimilation of educational information is different for all students. As a result, students in one study group can understand and understand the same

amount of information in different time periods - it remains one of the age-old problems in the field of education.

A number of other factors have a negative impact on students' learning of information:

- tasks and requirements set before the student do not correspond to the level of development of the hemispheres and age aspects;
- a delay in the formation of functional systems due to lagging behind in the anatomical development of some components of the student's brain;
- lack of development of important connections between hemispheres and internal spheres;
- proposed and used teaching methods do not match students' thinking types and gender characteristics. [Error! Reference source not found.] [Error! Reference source not found.] [Error! Reference source not found.] [Error! Reference source not found.]

At the same time, it should be taken into account that in the organization of the lesson process in the higher education institutions of our republic, without sufficiently activating the capabilities of the right hemispheres of the students' brains, relying more on the activities of the left hemispheres can activate only the functions of the left hemispheres and create mutually conflicting situations with the functions of the right hemispheres.

Explaining educational information based on the universal principle of organizing the activity of the cerebral hemispheres gives the teacher two advantages:

- 1) 1) students absorb educational information intensively;
- 2) 2) all students understand educational information to the same extent.

Our K.B. Kalankhodjaeva [17; 19], together with other methods of teaching, the synthesized method of education was used in our scientific research. In the experimental work, it was noted that the synthesized educational method had a positive effect on the intensive formation of cognitive activity and creative thinking of students. However, we believed that it is necessary to study the level of effectiveness of the synthesized educational method in the teaching process on the basis of experience.

The synthesized educational method modified by us is based on the universal principle of organizing the activity of the cerebral hemispheres of the learners and is based on the synthesis and reference of educational information.

Information provided by two subjects of the pedagogical process when using the synthesized educational method allows to take into account the neuropedagogical uniqueness of students. For this purpose, the interpretation of the information and tasks presented by one of the subjects of the pedagogical process should be expressed in an analytical, classification, abstract, algorithmic way and should be aimed at performing inductive operations. Information and assignments by the second subject of the pedagogical process should be aimed at students who have an emotional-emotional, figurative-intuitive thinking strategy, and should be directed to their perception of images as a whole, their figurative thinking.

The interpretation of the information and tasks presented by the first subject of the pedagogical process should be expressed in an analytical, classification, abstract, algorithmic way and should be aimed at performing inductive operations. Presenting information in this manner is intended to ensure that left-hemisphere-dominant students seek solutions to academic problems through logical analysis. During training, students will have to look for specific evidence, draw conclusions based on this evidence, and try to put forward new ideas.

Information and assignments from the second subject of the pedagogical process are intended for students with an emotional-emotional, figurative-intuitive thinking strategy, and they are directed to perceive images as a whole, and think figuratively. Information, examples, and educational tasks should be bright and colorful, emotional, and include visual-space modeling, design, etc. Referencing the information taking into account the specifics of the thinking strategy of students with the right hemisphere as the leader - leads to a creative approach to bringing complex information into a meaningful context and to the formation of creativity qualities.

In such a lesson, conflicting situations with individual lateration profiles of students do not occur. Conditions are created for students to acquire knowledge deeply and completely.

Results.

Based on the purpose of our scientific research, we put forward the following hypothesis: the use of a synthesized educational method based on the universal principle of organizing the activity of the cerebral hemispheres in explaining new educational material optimizes the process of assimilation of educational information, despite the fact that students have different memory systems and thinking strategies. Based on this hypothesis, we modified the synthesized educational method of teaching, which allows us to build on students' thinking strategies and information acquisition styles in the preparation and presentation of educational information.

In order to verify the correctness of our scientific hypothesis, the ability of the synthesized educational method to increase the effectiveness of the process of assimilation of educational information by students was tested at the Navoi State Pedagogical Institute.

105 1st and 2nd level students and 4 teachers of pedagogy took part in the experimental work.

Lectures on general pedagogy in control and experimental groups amounted to 30 hours.

The diagnostic method "Your SOLAT" co-authored by Ellis Paul Torrance and C.R.Reynolds, T.Riegel, O.E.Ball was used to determine the dominant hemisphere, thinking strategy and type of information acquisition of the students in the study groups in the first, ascertainment stage of the experiment.

Figures 1 and 2 below refer to the proportion of students in the control and experimental groups according to the type of thinking strategy and information acquisition based on the Ellis Paul Torrance method.

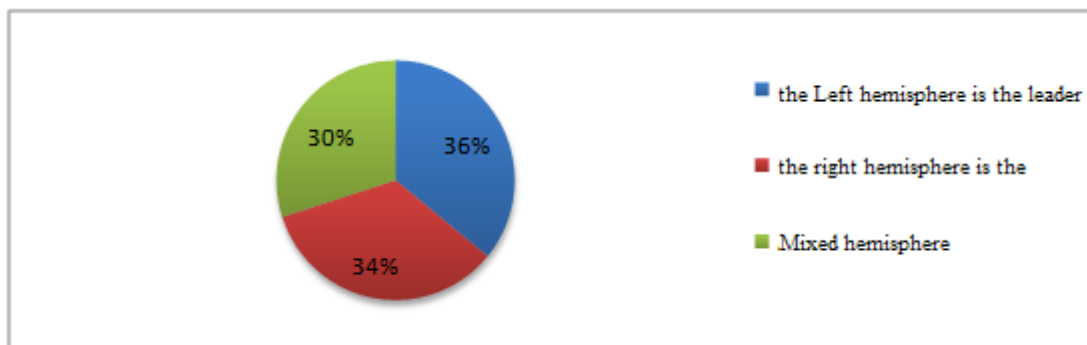


Figure 1. Proportion of students with left, right and mixed hemisphere leadership in the control group

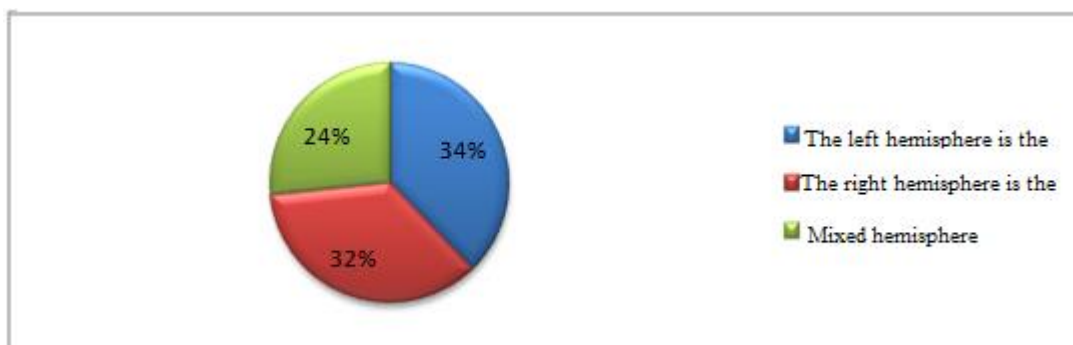


Figure 2. Proportion of students with left, right and mixed hemisphere dominance in the test group

At the same time, the learning indicators of all students were determined. In this, the method of pedagogical diagnostics "study and analysis of educational documents" was used. The results obtained with the help of diagnostic methods allowed a comparative analysis of the levels of mastery of subjects in the section of the leading hemispheres of students (Table 1).

Table 1

Students brain functional organization and the ratio between their mastery of subjects (finding phase)

№	Hemispheric leadership	Acquisition in the control group			Mastery in the test group		
		Excellent	Good	Medium	Excellent	Good	Medium
1.	The left hemisphere is the leader	8%	16%	12%	10%	16%	8%
2.	The right hemisphere is the leader	14%	18%	2%	20%	16%	6%
3.	Mixed hemisphere	8%	18%	4%	8%	14%	2%

After a comparative analysis of the leading hemisphere and thinking strategy of the students with their general mastery of subjects, we started the formative stage of experimental work. The formative stage of experimental work was conducted in March-May 2021.

At this stage, the pedagogues-teachers of the experimental groups were invited to perform the following tasks in order to use the synthesized educational method during the lecture.

1. Дарсга тайёргарлик кўриш босқичида бажариладиган вазифалар:

- giving tasks related to the topic to students in advance;
- formation of two lecture texts for one educational session, taking into account the features of the students' hemisphere strategy. The text of the first lecture should consist of a text based on verbal thinking, and the second - based on abstract-image thinking;
- selection of tasks and educational assignments, exhibition-picture and technical schematic materials for use by the subjects of the pedagogical process in the training session;
- to determine the neuropsychological relief of the educational group, the ratio of students according to the leading hemispheres and their indicators of mastering the subject by means of diagnostic methods;
- choosing the most active student from among the students in the group as the "second speaker" for each training session. For the second lecturer, organize preparation for the lesson based on the lecture text in accordance with the lateration profile.

2. Tasks performed during the lesson:

- one of the lecturers will refer to the study group step by step the text corresponding to a separate thinking strategy for each paragraph of the lecture text. A second speaker will comment on each referenced text with information according to the second thinking strategy;
- in the course of the lesson, the teacher controls the students' reception of information from the perspective of the leading hemisphere, performance of tasks and assignments by means of "feedback";
- the pedagogue-teacher should pay attention to the activation of at least two representative systems of students in the lesson;
- implementation of neuropsychological cooperation by dividing students with different laterality into small groups and giving them mixed tasks in order to strengthen the subject.

3. Tasks to be performed at the end of the lesson:

- students' own conclusions and interpretations of the information acquired through formative assessment;
- summarization of students' conclusions by the pedagogue-teacher.

In the observation phase, the science teachers in the control groups continued to conduct physical education sessions in the traditional way.

The "binary neuropsychological lecture" method was used in the teaching of each new topic in the experimental groups.

In the experimental groups, the main attention was paid to the following factors in determining the level of mastering of educational materials by students:

- the pedagogue-teacher should analyze his activity before the start of the lesson, plan rationally, and then clearly determine the course of activity together with the students;

- transparency of educational goals;
- the cooperation of teachers and students to achieve the set goals;
- to rely on the student's conscious acceptance of educational information

During the course of the lesson, students' opinions and answers were continuously evaluated. It was found that the science teacher's more targeted attention to the information that the students have not mastered in a goal-oriented way helps them to master the knowledge to the maximum extent.

Discussion.

After the formative experiments were completed, control measurements were conducted in order to determine the effect of the neuropedagogical-binary lecture method on students' mastery of educational topics. In this case, the indicators of students' mastery of educational materials were compared and analyzed with the results of the observation stage.

Diagnostic measurements carried out in the control groups showed that there were no significant qualitative changes in students' acquisition of knowledge in physics (Table 2).

Table 2

Brain functional organization of control group students and the dynamics of the ratio between their mastery of subjects

№	Hemispheric leadership	At the beginning of the experiment			At the end of the experiment		
		Excellent	Good	Medium	Excellent	Good	Medium
1.	The left hemisphere is the leader	8%	16%	12%	8%	16%	12%
2.	The right hemisphere is the leader	14%	18%	2%	14%	18%	2%
3.	Mixed hemisphere	8%	18%	4%	8%	20%	2%
Total:		30 %	52 %	18 %	30 %	54 %	16 %

At the end of the experiment, the ratio between the brain functional organization of students in the control groups and their learning of subjects is as follows: the total obtained indicators (excellent - 30%, good - 52%, satisfactory - 18%) and control indicators (excellent - 30%, good - 54%, satisfactory - 16 %) did not reveal a significant difference. There was a small positive change due to the increase in the acculturation index of the mixed-hemisphere student.

When analyzing the ratio between the brain functional organization of the students of the test group and mastering subjects, certain changes were revealed (Table 3).

Table 3

Brain functional organization of students of the test group and the dynamics of the ratio between their mastery of subjects

№	Hemispheric leadership	At the beginning of the experiment			At the end of the experiment		
		Excellent	Good	Medium	Excellent	Good	Medium
1.	The left hemisphere is the leader	10%	16%	8%	12%	20%	2%
2.	The right hemisphere is the leader	20%	16%	6%	22%	18%	2%
3.	Mixed hemisphere	8%	14%	2%	8%	14%	2%
Total		38 %	46 %	16 %	42%	52%	6%

In the test groups, the general performance indicators of students were as follows: excellent - 38%, good - 46%, satisfactory - 16%. It was found that as a result of the classes conducted by means of the neuropedagogical binary lecture method, a significant positive balance occurred as a student's mastery. By the final stage of the experimental work, the following changes occurred in the students' learning indicators: excellent - 42%, good - 52%, satisfactory - 6%. Qualitative changes in students' learning of science were as follows: excellent - increased by 4%, good - increased by 6%, satisfactory - decreased by 10%.

Conclusion.

The synthesized educational method ensured the transparency of educational goals during the lesson, the achievement of the set goals by the teacher and students in cooperation, and the conscious acceptance of educational information by students. The use of this method in explaining new material had a positive effect on students' complete assimilation of information, increase of their cognitive activity and formation of "literate thinking".

Along with the advantages of the synthesized method of education, there are also some disadvantages. For example, in the main part of the lesson, as a result of the time of presentation of the material prepared for left-hemisphere dominant students, a situation may arise as if teachers do not pay enough attention to right-hemisphere dominant students and put them in the "secondary plan". In order to prevent such negative consequences, it can be achieved by trying to distribute the time as evenly as possible by the lecturers in planning and conducting the lesson.

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REFERENCES:

1. Decree of the President of the Republic of Uzbekistan dated April 29, 2019 "On approval of the concept of development of the public education system of the Republic of Uzbekistan until 2030" / <https://lex.uz/docs/4312785>.
2. From the speech of the President of the Republic of Uzbekistan Sh. Mirziyoyev in his Address to the Oliy Majlis on January 24, 2020 [Electronic resource] <https://www.pv.uz/oz/newspapers/poslanie-prezidenta-respubliki-uzbekistan-shavkata-mirzieeva-olij-mazhlisu-2020>.
3. Mirziyoyev Sh.M. We will build a free and prosperous, democratic country of Uzbekistan together // Speech at the joint meeting of the chambers of the Oliy Majlis dedicated to the ceremony of inauguration of the President of the Republic of Uzbekistan. - Tashkent: "Uzbekistan", 2016. - P.14. <https://asaxiy.uz/product/knigi/ilm-fan-va-darsliklar/shavkat-mirziyoyev-erkin-va-farovon-demokratik-%D1%9Ezbekiston-davlatini-birgalikda-barpo-etamiz?language=ru>
4. Eremeeva V.D. Didakticheskie principle systemy L.V. Zankova eye neuropsychologist. URL: <http://www.zankov.ru/about/theory/article=106>
5. Dudko S.A. Razvitie neuropedagogiki v sovremennoy Frantsii // El.J. "Obrazovatelnoe prostranstvo Rossii i zarubezhnyx stran". - S. 72-74. <https://docplayer.ru/125827605-Neyrobiologiya-i-obrazovanie-mify-i-vzaimosvyazi.html>.
6. Eremeeva V.D., Hrizman T. P. Malchiki i devochki — dva raznykh mira. Neuropsychologist - I teach, educate, parent, school psychologist. - St. Petersburg, 2001. - 184 p. https://www.vodb35.ru/files/malchiki_devochki.pdf.
7. Ilyukhina V.A. Pismo s sekretome. Kniga dlya uchitelya. M.: Prosveshchenie, 2007. <https://www.ozon.ru/product/pismo-s-sekretom-kniga-dlya-uchitelya-136534023/>.
8. Kovalev S.V. Introduction to modern NLP: Psychotechnology of personality effectiveness: Educational guide. - M.: izd-vo "Flinta", 2002. -512 p. <https://m.books.ru/books/nlp-vvedenie-v-sovremennoe-nlp-psikhotekhnologii-lichnostnoi-effektivnosti-uchebnoe-posobie-525550/>.
9. Computational Explorations in Cognitive Neuroscience / Understanding the Mind by Simulating the Brain. Randall C. O'Reilly and Yuko Munakata <http://cognet.mit.edu/book/computational-explorations-cognitive-neuroscience>

10. Kuzmina A.T. Neuropedagogical approach to training in primary school through issledovatel'skuyu deyatelnost uchitelya // El.journal "Nepreryvnoe obrazovanie: XXI vek". Vypusk 3 (autumn 2014). -S.1-9. <https://cyberleninka.ru/article/n/neuropedagogicheskiy-podhod-k-obucheniyyu-v-nachalnoy-shkole-cherez-issledovatel'skuyu-deyatelnost-uchitelya/>
11. Karpenko M.P. Cognomics. M.: SGA, 2009. 225 p. http://www.muh.ru/nir_ikn.htm.
12. Nikolaenko N.N. Contemporary neuropsychology. -SPb.: Rech, 2013. <https://www.labirint.ru/books/363470/>
13. Sirotiyuk A.L. Neuropsychological and psychophysiological counseling training. M.: TTs "Sfera", 2003. <https://refdb.ru/look/3022089-pall.html>
14. Tunkun Ya.A. Basic neuropedagogy: history, theory and practice / J.: Kiberleninka, 73-2, -S.203-208. <https://socionet.ru/publication.xml?h=spz:cyberleninka:25235:11871047>
15. Evolutionary Cognitive Neuroscience / Edited by Steven M. Platek, Julian Paul Keenan, and Todd K. Shackelford / The MIT Press. Cambridge, Massachusetts. London, England. 2007 Massachusetts Institute of Technology. - 637 p. <https://mitpress.mit.edu/books/evolutionary-cognitive-neuroscience>
16. Gulyamov Dj.R. Cognitive process activity and interpretation of neuropedagogical studies / "Pedagogika" J., No. 5, 2015. -B. 29-35.
17. Gulyamov D.R., Kalankhodzhaeva K.B. K prorusu ocheta osobennostey mejpolusharnoy functional asymmetri mozga obuchaemyx and echebnom proceses // International scientific-research journal "Evroaziyskiy Soyuz Uchyonyx", No. 11 (56), 2018. 5 chapters. P. 38-43. https://euroasia-science.ru/wp-content/uploads/2018/12/38-43_Gulyamov_D_R_Kalanhodzhaeva_K_B.pdf.
18. Gulyamov Dj.R. Neuropedagogy: the basics of development / "Pedagogy" J., No. 4, 2015. -B.41-47.
19. Gulyamov Dj.R., Nurboyev Q.M., Mirzayev A.U., Kalankhodzhaeva K.B. Organization of the educational process taking into account the functional asymmetry of the brain of students as a factor of the development of thinking creativity / Palarch's Journal Of Archeology Of Egypt / Egyptology 17(6). ISSN 1567-214x / PJAEE, 17 (6) (2020) / P.3524-3534 / <http://www.palarch.nl/index.php/jae/article/view/1405>
20. Gulyamov Dj.R., Nurboyev Q.M., Khuzhakulov N.T. Teaching Children Of Preschool Age In Neurodidactic Conditions Printed Palarch's Journal Of Archeology Of Egypt / Egyptology 17(6). ISSN 1567-214x / PJAEE, 17 (6) (2020) / P.14485-14494 / https://ejmcm.com/article_3309.html
21. Michael S. Gazzaniga. The Cognitive Neurosciences. A Bradford book the Mit press: Cambridge, Massachusetts, London, England. - 2009 Massachusetts Institute of Technology <https://www.amazon.com/Cognitive-Neurosciences-Michael-S-Gazzaniga/dp/0262071576>
22. Paul Harris, OD., F.C.O.V.D. Wet Mind, a New Cognitive Neuroscience and its Implications for Behavioral Optometry / https://www.academia.edu/6427683/Wet_Mind_A_N
23. Akramova G.R. Modern approaches to the development of critical thinking of students UK Vol. 7 No. 10, 2019 Special Issue: Education in Uzbekistan ISSN 2056-5852 / European Journal of Research and Reflection in Educational Sciences. <http://www.idpublications.org/wp-content/uploads/2019/09/Abstract-MODERN-APPROACHES-TO-THE-DEVELOPMENT-OF-CRITICAL-THINKING-OF-STUDENTS.pdf>
24. Yunusova N.H., Gulyamov Dj.R., Anvarova V.J. Regarding the study of the correlation of the activity of the cerebral hemispheres of children with their gender differences / "Pedagogika" J., No. 2, 2016. B.37-42.