Experimental approbation of Neuro didactic technology of distance learning of students at the ascertaining stage

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Annotation. The article, which is offered to a wide range of the scientific community, describes an experimental study of the Neurodidactic technology of distance learning of students at the ascertaining stage. The experimental work included the development of its methodology, the formation of experimental and control groups, the collection and systematization of information about the participants of the experiment. When getting acquainted with their data, the following methods were used: A test method for diagnosing the properties of the nervous system of the Ego.Strelau, design of diagnostic sheets when using methods of observation, analysis of educational products, testing, and written survey.

Experimental reflection at the ascertaining stage was expressed in the conclusion about the mixed type of lateral characteristics of the participants of the experiment and the feasibility of using mixed strategies for the presentation of educational material, the dialogic style of pedagogical communication, and intermediate diagnostics at the subsequent stages of the experiment. This type of lateral brain asymmetry is the most common in the academic environment, which gives universality to the recommendations made.

Keywords: experimental research, neuro-didactic technology, distance learning, students, ascertaining stage, methodology, experimental and control groups, diagnostic sheet

The product of the author's project activity in the field of neurodidactics of students was the neurodidactic technology of their distance learning. The components of the technology are: 1) formation of motivation, 2) development of the training content, 3) creation of its program, 4) implementation of the program in the educational process, 5) control of the formed competencies.

The effectiveness of the technology developed by us was tested experimentally. The methodology of the experimental study is shown in table 1.

Table 1.

Experimental research methodology

The purpose of the experiment: to test the effectiveness of Neuropedagogic technology of teaching students.
Tasks: 1) organize the approbation of Neuropedagogical technology of teaching students; 2) prove the effectiveness of the technology.
Hypothesis: The neuropedagogic technology of distance learning of students will be effective if, when applying its main provisions, the final indicators in the experimental group are higher than in the control group.
The object of the experimental study: 110 students (55 students in the experimental group and 55 students in the control group). The object of the experimental study: 110 students (55 students in the experimental group and 55 students in the control group).
The subject of the experimental study: Neuro-didactic technologies of distance learning of students.
Criteria for the effectiveness of the technology: competencies formed during the experimental study period.
Training levels: zero, reproductive, heuristic, creative.
Forms of experimental research: group, study circles, electronic circles.
Methods of experimental research: testing, questionnaires, filling out diagnostic sheets of students, observation, study of products of activity, self-management, multimedia presentations, qualitative analysis, quantitative calculation of results.
Methods of information processing: mathematical calculation, analysis of written works and evaluation forms.

Stages

stating *(2020)*	*forming* *(2021)*	*control* *(2022)*
- development of the experimental research methodology; - formation of experimental and control groups; - collection and systematization of information about the participants of the experiment: familiarization with their data and filling in diagnostic sheets.	1. Teachers reflection on taking into account the lateral asymmetry of the brain in the process of teaching students. 2. Implementation of the main composite components of the technology. 3. Implementation of the author's neuro-didactic recommendations and provisions in the educational process. 4. Intermediate diagnostics of the formed competences of students.	Final diagnostics of the formed competences of students.

From the data placed in the table, it follows that the implementation of the experimental method involved three stages: the ascertaining, forming and control. At the ascertaining stage, the basis for conducting an experimental study was determined. It became FGBOU VO "Pyatigorsk State University" and FGBOU VO "Ingush State University".

As a form of experimental work, we chose distance learning under the additional professional program "Modern information and communication technologies and e-learning technologies in higher education" with a volume of 72 hours. It was logical to assume that the students had different lateral features. The training was conducted in April 2020.

At the first introductory lesson, the students were introduced to the experiment conducted on the basis of these universities. Everyone agreed to participate in the experiment. The subjects were divided into equal quantitative groups – experimental and control. As a result, the experimental and control experimental groups consisted of 55 people each.

Then we got acquainted with the content of the additional educational program that was studied in the groups we formed. The program "Modern information and Communication Technologies and e-learning technologies in higher education" was presented by the following modules: 1) information culture of the individual in the educational process of the university, 2) formation of communication skills by means of computer science, 3) modular training at the university, 4) rational methods of teaching communicative competence at the university, 5) formation of self-educational competence of students based on project technology, 6) organization of independent work of students based on Internet 2.0 in the information and learning environment.

The diagnostic sheets [1] of the experimental participants were filled in. This type of work according to the category of subjective experience (attitude to the educational material) reflected the following characteristics of the subjects. Their average age was 19 years. The conscious needs [2] and motivation of the majority of students consisted of professional and career growth, high wages. The subjects had no unconscious needs. The participants of the experiment associated the personal meaning of completing this additional educational program with professional mobility, the opportunity to change their profession or its profile. Students A. A. Kaisheva and L. A. Malsagov in the experimental group expressed a desire to get vacancies in the capital's universities. The male representatives in the control group (M. I. Gelogaev, I. I. Akiev, M. A. Mautiev) justified their choice of the program by their personal interest in computer science. All the students demonstrated their readiness to study.

The continuity of the content of additional educational programs with previous subjective experience and the formation of individual cognitive abilities were diagnosed during the formative stage of the experiment due to the expediency of using methods of observation and analysis of educational products to obtain reliable results. As a result of calculations and analysis of the results for the named categories of subjective experience, we concluded that the categories of subjective experience were expressed in the subjects of both groups.

Data on the activity of brain processes [3] of the subjects according to the second part of the diagnostic sheet of the student were obtained based on a series of independently performed tests for the diagnosis of perception, memorization, logical memory, logical thinking, understanding, voluntary attention, speech. The test results in their total expression for each participant of the experiment reflected approximately equal average and close to high indicators in both groups. We explain the rather high activity of brain processes in all subjects by the specifics of pedagogical activity associated with intellectual work.

The predominance of intuition or reasonableness according to the parameter "Activity of brain processes" we checked by a written survey. In the questionnaire, addressed to each subject, it was necessary to cross out the wrong answer from the two suggested answers.: intuition or reasonableness. As expected, about one-quarter of the girls in both groups left "intuition" as the correct answer, the other three – quarters of the girls - "reasonableness". All the young men of both groups preferred "reasonableness"as the correct answer. The results of the diagnostic survey are quite consistent with the neurodidactic data on the lateral features of the brain of male and female representatives.

The next two points of the diagnostic list of students were clarified by us in the course of their training in additional educational programs as part of the formative experiment. Following the systematic presentation of the material, we will put this data here. The continuity of the

content of additional educational programs with previous subjective experience according to the fourth category varied from the presence of knowledge and skills on the topics of individual classes in both groups to the lack of awareness of the material being studied. In the experimental group, A. I. Mamieva was sufficiently knowledgeable in the field of modular training at the university, which was explained by the experience of professional activity. In the control group, A. A. Sergeev demonstrated a fairly high level of awareness in the field of information design technologies. From interviews with students of both groups, we found out that the subjects have situations that are important for the formation of the competencies inherent in program training.

Data on the formation of individual cognitive abilities of the subjects according to subjective experience were obtained using questionnaires in both groups. The trainees were asked questions similar to the characteristics of these abilities contained in the diagnostic sheets. To obtain reliable data, the teachers of both groups confirmed or disagreed with the opinion of the respondents. If the teacher disagreed, the respondent's opinion was considered erroneous and was not taken into account when calculating and summing up the results. In quantitative terms, they are reflected in table 2.

Table 2.

Formation of individual cognitive abilities of the participants of the experiment

individual cognitive abilities of the subjects	Experimental group (pers.)	Control group (pers.)
transformational (independent use of previously studied educational material)	39	40
transfer (the ability to transfer past experience to new educational and professional situations)	37	36
analytical (the ability to organize, organize your past experience)	45	48
simulation (the ability to reproduce your past experience in new educational and professional situations)	48	50
ability to reflect on your experience	55	54

As a comment to the data placed in the table, we note the overall high rate of formation of individual cognitive abilities of the subjects. The minimum score is 37, and the maximum score is 54 out of 59. We believe that the diagnostic results for this category of subjective experience could be even higher with a purposeful and longer-term study of the subjects.

The ability to generalize, creativity, strength, mobility, balance, dynamism, lability, and activity of thinking were tested using a test method for diagnosing the properties of the nervous system of the Ego.I shoot. This task required time (45 minutes), and therefore it was addressed to the students of both groups as homework. The subjects were offered forms with questions and instructions. They counted the answers themselves. The result of the test method in both groups was the predominance of the pronounced strength of the processes of excitation and inhibition, mobility and balance of nervous processes. At the same time, there was a tendency to increase the strength of the inhibition process, as well as cases of unbalanced nervous processes (in the experimental group – 3 people, in the control group – 4 people).

The IQ value for all students was obtained from the introductory classes conducted with the permission and participation of teachers P. V. Ivanov, P. D. Chanieva. The average IQ of the subjects in the experimental group was 102%, in the control group – 104%.

The last item of the diagnostic sheets of the subjects – functional asymmetry of the brain-was detected by testing performed by students at home. Detailed instructions and a key to the answer allowed the subjects to determine their lateral organization with a high degree of probability. When checking the registration forms, it was found that in both groups (in the experimental group – 68%, in the control group – 71%), a mixed type of interhemispheric asymmetry of the brain prevails. 25% of the subjects (girls) in the experimental group and 20% (boys) in the control group referred themselves to the" right hemispheres". In the experimental group, 7% of the subjects (boys and girls) and 9% (boys and girls) in the control group referred themselves to" left hemispheres".

The analysis of the obtained data confirms the neuropsychological idea of correlation of the lateral characteristics of the student in the process of his distance learning at the university. In the modern society of rational, intellectual type, "right-hemispheres" adapt (adapt) to social requirements, foundations, value priorities, developing the left hemisphere of their brain through characteristic activities: intellectual activity, pragmatic decisions, concrete conclusions, reactivity, decisive actions, etc. It is noteworthy that the majority of girls (genetic owners of right-hemisphere brain asymmetry), who made up the bulk of the subjects in both groups, demonstrated an acquired mixed type.

However, according to the registration forms, in three cases in the experimental group and in two cases in the control group, a mixed type was detected among young men (the predominant owners of left-hemisphere brain asymmetry). We believe that it is also acquired due to the nature of the training activity.

A diagnostic study of the functional asymmetry of the students ' brains led us to the conclusion that the participants of the experiment live and carry out training according to a

mixed type of lateral characteristics that contributes to their development. Based on this, the teacher in such an audience should use a dialogic style of pedagogical communication, which involves mixed strategies for presenting educational material and reflection on their effectiveness.

References

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