

Ethics of New Technologies in Distance Learning of a Foreign Language: a Neuroscientific Approach

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Abstract: *The article proves that in recent years important advances have been made in neurobiology regarding education. With advanced scientific knowledge of cerebral activity in learning, educators have the opportunity to use interesting tools to improve academic performance in higher education when teaching a foreign language. Based on research on brain function, educators have created distance-learning tools useful for teaching a foreign language. While these tools are an important and critical element of the learning process, the emphasis in this study is different, that is, to teach students to become familiar with their own brain function and then to mobilize their metacognitive resources during distance learning. In this regard, teachers have faced many issues of organizing feedback from the study group, transferring learning materials to distance education platforms, monitoring progress and many others, while engaging the metacognitive resources of students. The issue of formation of information and communication and neurocompetence of foreign language teachers has become especially urgent in the pedagogical environment. Due to the lack of relevant skills, teachers had to adapt to the new educational conditions and completely restructure the educational process.*

Keywords: *Distance learning technologies (DLT), electronic services, linguistic education, network education, metacognitive resources, neurocompetencies of teachers.*

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Introduction

Currently, it is crucial to create a learning environment with distance learning technologies within foreign languages teaching to meet the current objectives. Besides, it is important to examine the terminology related to the problem in question, assess the benefits and drawbacks of these technologies, look into the forms of distance learning setup and specify professional abilities and skills of foreign language teachers at universities.

In accordance with the recommendations of the Ministry of Science and Education, many institutions of higher education immediately switched to a distance learning format under the threat of the spread of COVID-19 coronavirus infection, the Russian-Ukrainian war. The emergency transition to distance learning is a forced measure aimed at reducing the risks of morbidity and danger under conditions of war. All face-to-face classes (lectures, seminars, and laboratory work) were transferred to the electronic information and educational environment of the educational institutions. With the help of current distance-learning technologies, teachers provided access to information materials and organized communication between the participants in the learning process.

Since the organization of distance learning differs significantly from the organization of learning in the usual full-time format, teachers have to radically reshape the learning process.

However, statistics show that every third teacher practically does not use current ICTs and Internet social services in pedagogical activities. Consequently, the level of mastery of the corresponding learning technologies is low. And there are several good reasons for this. Firstly, the effectiveness of the learning process in a distance format largely depends on the information infrastructure of the educational institution: the availability of its own distance learning platform on the basis of which the basic and additional educational programs have been created. Secondly, it is necessary to have electronic educational resources capable of meeting the cognitive needs of students at different stages of training. Thirdly, it is necessary to take into account the need to build the competence of foreign language teachers in the use of distance learning technologies, as well as in professional retraining of teaching staff in this field of knowledge. Fourthly, the lack of feedback from students due to the lack of experience of foreign language teachers in organizing networking and building interactive teaching models.

Exploring the use of the latest technologies in distance learning of foreign languages is the cornerstone of scientific studies by Ukrainian and

foreign researchers. The issue of explaining the neuroscientific approach to the use of innovative technologies in foreign language distance learning has been devoted to the works of Robert (2010), Sysoyev (2019), Titova & Samylenko (2017), who reveal the beneficial effect of educational elements on one's understanding of the brain and how it works, and Nerubasska et al. (2020) investigate the effectiveness of applying these elements to students in the educational system and advocate that the metacognitive approach can have a positive impact on outcomes and overall student success in distance foreign language learning. Bahji et al (2015) analyze the essence of distance learning and its neuroinfluence on students, explore the terminological apparatus, identify relevant concepts that reveal the essence of distance learning. Chaudhry et al. (2021), analyze the most effective forms of distance learning technologies in linguistic education, argue a neuroscientific approach to digital services in universities.

The purpose of the article is to study the neuroscientific approach to the use of innovative technologies in foreign language distance learning; defining the essence of distance learning and its neuroinfluence on students; defining the form of distance learning technologies in linguistic education, explaining the neuroscientific approach.

The methodology of the study involves the study of the specifics and opportunities for the use of digital technology in foreign language teaching and explaining the neuroscientific approach to the use of innovative technologies in foreign language distance learning.

Applying neuroscience to the use of advanced tools in distance learning of foreign languages

Information technologies implemented in distance learning of foreign languages increase the impact of pedagogical elements on one's brain functioning and its application in an educational setting. Therefore, the metacognitive approach can be beneficial for results and overall accomplishments. Yevstigneyev (2020) claims that this approach is beneficial, particularly for the purposes of fostering greater self-awareness and encouraging student autonomy in distance learning of foreign languages.

Metacognition is the awareness of one's own cognitive processes and the understanding that comes from them. The literature review has clearly shown and affirmed the significance and effect of metacognition on the learning process. There is a distinction between metacognition (knowledge about one's knowledge) and information regarding cognitive processes in terms of metacognitive proficiency in distance learning of foreign languages.

Metacognitive abilities are the process-based knowledge required to direct and control one's own learning. In this research, both elements are linked through their theoretical characteristics and the means they employ. However, it is the influence of metacognitive abilities that is the principal focus.

To evaluate the potential impact of an intervention programme on self-awareness and autonomy of students, one needs to first clarify these concepts and find out what can be quantified. It is a widely accepted thought that having an understanding of oneself is indicative of success.

All individuals possess this understanding, which can be elucidated through self-evaluation. This notion is highly multifaceted: a combination of distinct ideas. Stored in one's memories, the concept of self is largely dependent on one's view of one's own life experiences. Even if it is not based in reality, a healthy self-concept can lead to greater academic success.

Evidence from a variety of studies, such as Polat (2007), has found a correlation between self-efficacy and academic success.

An additional potential outcome of an intervention programme is the fostering of autonomy, originally conceived as the capability to obey one's own rules. The educational field offers a distinct definition of autonomy, different from the definitions found in philosophy, psychology and pedagogy. This research largely looks into the educational field.

Consequently, the demand for the integration of knowledge, strategies and behaviours to realize school objectives leads to the enhancement of autonomy in distance learning of foreign languages. Employing these components necessitates the application of certain executive processes, such as organizing, self-control and adaptability, known as self-regulation. Self-governance of the system guarantees autonomy. Metacognition generally alludes to a greater level of reflection, in which the task of learning is regulated by the association of observation and assessment. As demonstrated by Gayevskaya (2007), self-regulation of motivational and cognitive processes has a positive effect on student success in distance learning of foreign languages.

Hence, engaging metacognitive resources can aid in improved self-understanding and can facilitate more precise self-assessment. These components are relevant for self-control of cognitive activities to advance autonomy in learning and improve academic attainment.

Neurophysiological studies suggest various aspects of brain activity in adolescents during distance learning of foreign languages. Through reorganizing neural connections and practicing a form of neural "pruning" to create a smoother network that can be accessed in adulthood, it is

possible to control increased synaptic energy expenditure, making this an optimal time for the growth of cerebral plasticity. The brain's aptitude to adjust itself to changing conditions begins during the early stages of life, allowing one to develop a reliable and practical stability in adulthood, as John (2015) pointed out.

Adolescence is identified by a heightened axonal myelination, resulting in a faster rate of nerve impulse and, as a result, an increased efficiency. This final point signifies the steadying of axonal channels which should be solidified in adulthood, coupled with synaptic variability, which is more prominent than in adulthood.

With the recognition of this scientific understanding, it has been made possible to generate educational content more suitable for this group of adolescents, while being able to inform them in a straightforward way about their behaviours and attitudes, as well as their learning capability and academic outcomes.

The essence of distance learning and its neuroinfluence on students

The data of individual profile of functional asymmetry of a student's brain at the moment of designing classes by a teacher in distance learning are not taken into account much. The human body is functionally asymmetric. It is manifested in different forms of behavior. In different behavioral responses are built, like human consciousness, on the right or left type. The following distance learning thinking mechanisms are used (Cook et al., 2004).

- Allows you to work with an abstract chain of symbols, texts, etc. (left-hemispheric, symbolic or logical);
- provides work with sensual images, with ideas about these images (figurative or intuitive).

In the process of individual and frontal questioning, when knowledge testing is organized, mostly the teacher uses 83% of the techniques that develop the left hemisphere of the brain.

Such techniques achieve the formation and development of cognitive universal learning activities in distance learning:

- analyzing details of objects and processes, results obtained;
- identify differences and common features of objects and processes, peculiarities of external and internal structure of the object;
- work according to an algorithm;
- classification and creation of categories, etc.

Teachers are known to use only 16% of the methodological techniques in distance foreign language teaching lessons that develop the

capabilities of the student's right hemisphere. A person understands and remembers the best when information and activities are recorded in the visual-spatial memory system. This system is arranged in such a way that information is stored strictly as in a library, as in a catalog and context according to one of the basic statements of neuropedagogy.

Considering the terminological apparatus, we should find relevant concepts that reveal the essence of distance learning.

E-learning is this type of learning, which involves the use of information and communication technologies. Currently, this type of learning has achieved popularity and spread in its own methodology of teaching a foreign language and allowed a completely modified view of the structure of the educational process, Duhaney (2004).

The system of e-learning is able to develop together with the systems of synchronicity and asynchronicity in Internet communication and contributes to the optimization and intensification of the educational process and the formation of skills to work with the latest technologies. The variability of ICT innovations contributes to the satisfaction of information hunger of almost any student and allows intensifying the opportunities for the development of students' creativity and their research abilities, which allows laying the foundation for the formation of professional qualities.

Distance learning is an open form of interaction between a teacher and students who are far away from each other. Distance learning organization is created on special electronic educational platforms. Distance learning takes into account the specifics of the educational process, taking into account the peculiarities of structural features: goals and objectives, approaches and principles, the content of training, organizational forms, methods and teaching methods. The methodological perspective of this learning format emphasizes the high level of independence of students who choose this type of learning through a convenient, flexible and adaptive educational process that meets their individual characteristics and needs. Distance learning is the result of innovative processes in education and the ability to learn throughout life (Nerubasska & Maksymchuk, 2020).

Considering the methodological potential of DLT in linguistic education, it is necessary to note the positive and negative aspects of the use of these technologies in the educational process. Undoubtedly, compared to traditional educational technologies, DLTs have a number of undeniable advantages. First of all, with the help of DLT, a learner gets unlimited access to all electronic educational resources within the educational course regardless of his/her location and time of day. This approach is optimal for most learners and allows them to combine work and learning. In practical

terms, DLTs offer educational opportunities to people regardless of their age, gender, nationality, ethnicity, or health status. DLTs potentially equalize the quality of education for all institutions, making education more accessible. Current DLTs allow existing curricula to be quickly and efficiently restructured to meet new requirements that define learning strategies, Shulgina & Talzi (2021).

If necessary, the learning content can be supplemented with relevant information. The use of DLT contributes to the development of information-analytical skills of students, which allows them to freely navigate in the information and educational environment, quickly search, analyze and arrange facts, and then put the acquired knowledge into practice.

Working with DLT implies a high level of independence of the student. In the process of learning, he/she independently makes responsible decisions on the issues being studied.

Flexibility and adaptability of DLT allow creating an individual learning trajectory for each learner. Many distance learning programs are built on a modular principle, in which the student independently chooses the sequence of learning material. Moreover, DLTs provide for the possibility of changing and adapting electronic educational resources to the student's needs, allowing him/her to choose only those disciplines that are most important to him/her.

DLT technology involves employing the latest information and communication tools to enable the acquisition of necessary skills and abilities in line with the most recent educational standards. E-courses are regularly updated, providing students with up-to-date information on the topics they are studying, Sysoyev & Yevstigneyev (2011).

DLTs have a high degree of mobility in terms of feedback from the teacher and other participants in the learning process. Interaction with the teacher is carried out when necessary on each specific issue. The teacher is always open for discussion and comments. At this stage the availability of feedback is seen as one of the professional attitudes of the teacher.

Assessment of the effectiveness of learning with the help of DLT is carried out automatically, without the participation of the teacher. The variability of forms of control implies the assessment of knowledge from different sides, which provides a continuous process of formation of key competencies of the learner. E-learning allows you to develop a system of clear criteria and indicators for assessing the knowledge obtained by each student.

Forms of distance learning technologies in linguistic education: a neuroscientific approach

When designing lessons with the help of distance learning technologies, the teacher should organize the student's activity taking into account the fact that left and right hemispheres will function equally. The data of neuropedagogy allow to use the peculiarities of left- and right hemisphere students' perception and their style of work more effectively. A number of studies show that right-hemisphere students will work successfully during distance learning in pairs and in a group, while left-hemisphere students need to work individually.

For example, there are certain recommendations for the organization of educational psychological (arrangement of students) and psychosocial (interpersonal communication "teacher - students") during distance learning. People perceive information in different ways, process it differently and remember it differently, developments in the field of cognitive psychology have shown. In this regard, the organization of the educational process should take into account, Sysoyev & Yevstigneyev (2010).

- a) individual lateral profile (functional asymmetry of the brain);
- b) gender differences;
- c) type of character;
- d) type of sensory-perceptual organization of experience (consideration of the leading channel of perception and information processing);
- e) level of development of higher mental functions.

The most effective forms of DLT in linguistic education are:

- Web-exercises, the essence of which was to conduct training sessions aimed at practical skills acquisition, namely, seminars, conferences, business games, laboratory works, using the means of telecommunications and the Internet. Web-based classes are characterized by communication through specialized forums. This process implies multiday work and asynchronous nature of interaction between the participants of the educational process.

A more effective form in comparison with web-lessons in the construction of distance learning are chat-lessons, which provide simultaneous access of all to the discussion in the online mode.

Teleconferencing is used in parallel with the above forms of training. All students receive a call for a teleconference by e-mail in advance.

Teleconferences can be broadcast in two modes: online and offline. Online conferencing has the following features: participants in the educational process in real time communicate with the teacher and receive

certain information, discussing and performing tasks. Off-line format allows viewing previously recorded video lessons with the teacher.

In this organization of the educational process the student performs practical assignments and acquires sustainable automated skills. Teleconferences are effective for visual learning of phonetics: listening and repeating phonetic exercises after the teacher.

Telepresence is an effective experiential learning based on the idea of replacing the teacher with a virtual robot (bot), which performs his functions. The virtual robot can give lectures and ask questions and conduct practical classes. In this way, students can have an impression of communicating with a "live" instructor.

Students can independently study multimedia and electronic educational resources using case technologies, which form a system of distance learning. Each case is a complete educational-methodical complex. It consists of lectures, seminars and practical trainings. The peculiarity is that all cases are interconnected, also they form an integral modular training course, Sysoyev & Yevstigneyev (2014).

Network technologies are also effective. They involve the use of special computer programs and electronic publications in the learning process and are openly accessible to the local network of the educational institution.

There are such current forms that help to organize training with the help of preschool education and promote the use of distance education platforms such as: Moodle, Google Classroom, MyLMS, Ya Klass, etc.

Such platforms are a combination of ICTs and fully adapted for use. In addition to distance education platforms, Web 2.0 technologies (blogs, wikis, podcasts) requiring social services of the Internet (Facebook, Instagram, Twitter, etc.) are also effective.

For better communication also serve the means of synchronous Internet communication, which can provide the ability to make video calls and conduct online video conferencing (Zoom, WhatsUp, Skype, Fb Messenger, VK Messenger, etc.).

Students' progress can be monitored through various types of online testing, namely: Dziuban et al. (2005).

- a) lecture testing, used after listening to each lecture in a module;
- b) module testing, used to test knowledge within a particular module;
- c) individual online training, aimed at solving problems of practical nature and a combination of test tasks with several modules;
- d) control testing, conducted at the end of the studied discipline or course (Gaevskaya, 2007).

Considering that DLTs have proven to be an effective learning tool, many universities have already refused to return to the full learning model, considering as an option the blended learning model, when DLTs can replace lectures.

Conclusions

The importance of this article lies in exploring the neuroscience behind employing cutting-edge technologies for distance learning of foreign languages and demonstrating how neuropedagogy advocates for organizing instruction according to psychophysiological and neuropsychological principles. Although the research in the field of neuropedagogy is recent (even in comparison with neurolinguistics), its emergence is quite natural and natural: the importance of achievements of neuroscience is more and more recognized by teachers of theoretical and practical disciplines both in schools and in universities.

The article also defines the essence of distance learning and its neuroinfluence on students, because distance learning technologies involve the purposeful organization of educational activities of students, using ICT. Communication between the participants in the educational process occurs indirectly. The advantages of such training are that the training can take place at a convenient time for each participant, using a convenient pace of information transfer, individual interests and needs. Considering the above-mentioned features of the educational process organization, DLT is the most convenient tool to help implement the system of principles of person-centered approach.

Also in the definition of the form of distance learning technologies in linguistic education: web-lesson, chat-lesson, holding a teleconference, etc. The advantages of these classes are proved, because even in the case of impossibility to attend them, the student has the opportunity to record the conference and work through the key concepts of the topic independently. The article also identifies the importance of the neuroscientific approach in the ethics of new technologies in distance learning of a foreign language.

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