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**INDIVIDUAL EDUCATIONAL PATH BASED ON LEARNING STYLES THEORY  
AS A WAY TO REACH SUSTAINABLE QUALITY EDUCATION GOALS**

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**Abstract**

Following the goals of sustainable development in the sphere of teaching professionally oriented foreign languages, the paper presents the results of the long term research aimed at collecting data about particularities of students representing different generations necessary for changing the system of professionally oriented foreign language teaching in non-linguistic technical universities in order to increase the efficiency of teaching specialists using a foreign language in professional activities and reach the aim of quality education for future generations. The research was carried out twice in 2012 and in 2019 on the basis of Howard Gardner's multiple intelligence theory. The paper analyses the difference in learning styles of two generations of students showing the difference explained by constantly changing social environment. The collected data proved the necessity of changing the training contents and training approaches, introducing technologies and promoting learners autonomy. Often student-oriented approach is understood as a possibility of choosing teaching materials depending on the level of proficiency; we offered an approach of choose teaching "tools" depending on individual characteristics of every student to reach the most efficient results within the student's personal educational pathway.

**Keywords**

Sustainable development – Learning styles – Solitary and social learners – Learner autonomy

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## Introduction

Sustainable development program adopted in 2015 by the UN set goals for the governments and professionals in all spheres of human activity up to the year 2030. The program consists of 17 goals aimed at eliminating poverty, preserving the planet's resources and ensuring well-being of people all over the world. Each goal contains a set of indicators to be achieved within 15 years. According to the UN definition, sustainable development is understood as ensuring that the development of the current generation does not contradict the interests of future generations. Though only one of the 17 goals is directly connected with education, we understand that only with the help of high quality up-to-date education all the other goals can be achieved. Education contributes to reducing inequality and achieving gender equality, even to solving health problems and problems concerning cultural development. It promotes technical and investment cooperation among nations. Goal number 4 "Quality education" sets a challenge to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. The achievement of this goal cannot be seen directly in the results of exams of any level but it would be obvious through the analysis of the standards of living in a particular country. Foreign languages also add a lot to strengthening the means of implementation and enhancing the work of the global partnership for sustainable development, Goal 17.

The reasons that prevent the younger generation from acquiring quality education are the lack of qualified teachers and access to adequate educational institutions, according to the UN provisions. Looking deeper into the problem we can speak about the outdated approaches to the education of the younger generation, which makes the qualification of teachers poor, not up-to-date. Teachers cannot meet the urgent requirements. Rapid technological development of our society determines the difference between generations. In the twentieth century and earlier, the same characteristics that characterized an entire generation could describe people with an age difference of several decades or more. Accordingly, education systems met the needs and demands of several generations and did not require constant modification in accordance with changing conditions. At present, the situation is fundamentally different. The development of technologies and digitalization leads to the situation that the education system is not able to keep up with the progress. Most of today's students will work as professionals in spheres that do not yet exist. Moreover, this statement is true for all students born at the last decades of the 20<sup>th</sup> century up to the first decades of the 21<sup>st</sup> century.

## Theoretical basis

Our researches were carried out in 2012 and in 2019-2020 on the basis of Howard Gardner's multiple intelligence theory<sup>1</sup>.

## Materials and Methods

In the first decade of the 21<sup>st</sup> century the introduction of new technologies, new ways of communication affected all the spheres of human activities, including educational institutions. Universities, including technical universities, faced the need of alteration of the approaches to the educational system as a whole and to the process of foreign languages teaching. In Russia a humanitarian approach in education was declared as the only basis

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<sup>1</sup> H. Gardner y T. Hatch, "Educational implications of the theory of multiple intelligences", Educational researcher, Vol: 18 issue 8 (1989): 4-10 <https://doi.org/10.3102/0013189X018008004>

for contemporary education. The study of foreign languages was conducted within the framework of a personal-oriented approach, modern pedagogical technologies were applied, and the communicative method became the main method used in teaching foreign languages in secondary schools and universities. Many scientific schools sought approaches to answer the requirements of new reality.

Our researches were carried out in 2012 and in 2019-2020 on the basis of Howard Gardner's multiple intelligence theory. We used free learning styles inventory test (<https://www.learning-styles-online.com>). Students were supposed to answer 70 questions to gain an understanding of personal learning styles. The paper analyses the difference in learning styles of two generations of students showing the difference explained by constantly changing social environment. Paying attention to different aspects of the intelligence theory, we tried to define the new generation with its new requirements to the system of education in order to change the aspects of teaching professionally oriented English.

## Results

The first research aimed at finding new methods and approaches to meet the requirements of the new century and new generations was carried out in MATI ("MATI" - Moscow State Aviation Technological University; Today's name is "MAI" - Moscow Aviation Institute) in 2012.

About 800 first year students took part in the study. All participants answered a number of questions, including the question "What is your opinion about working with podcasts?" 788 responses were received, including: 1. "I liked the work" - 74.75%, 2. "It is difficult, there was no such work before" - 13.45%, 3. "I didn't like this type of tasks" - 6.22%, 4. "I cannot say" - 5.58%. (Fig. 1)

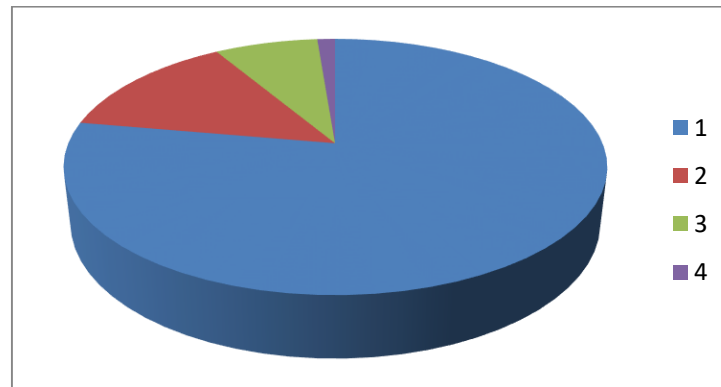


Figure 1

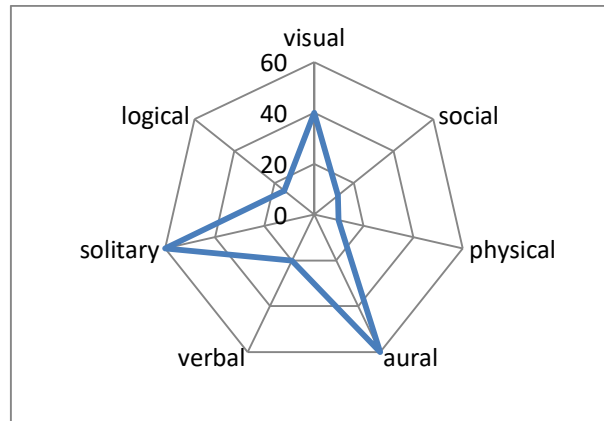
Students answers to the question "What is your opinion about working with podcasts?"

Detailed results of this research on the use of podcasts in organizing autonomous work of students in teaching English are given in the work published earlier<sup>2</sup>. The results showed that podcasting had made a difference in the process of learning the English

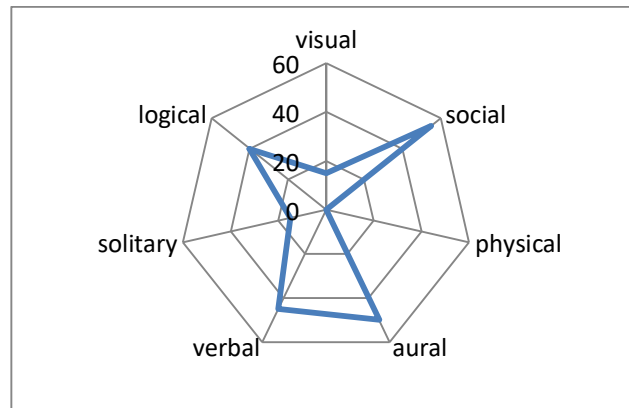
<sup>2</sup> Galina G. Artyushina; Olga A. Sheipak; Elena I. Baguzina y Olga G. Plekhova, Developing Communicative Competence Through Internet and Digital Technologies. The magic of innovation. New techniques and technologies in teaching foreign languages/Edited by Dmitry A. Kryachkov, Elena B. Yastrebova, Olga A. Kravtsova. Newcastle upon Tyne. 2015. 43-67

language and was well received by the students<sup>3</sup>. It should be emphasized that students were not using podcasts in the classroom while communicating with the teacher, but partly autonomously, under the teacher’s guidance, while preparing for classes<sup>4</sup>. The method of using podcasting in these conditions is described in detail<sup>5</sup>.

Further, the authors attempted to explain the reason for the positive perception of the proposed technology. Analysis of the available literature has led to the need to evaluate the teaching styles of students themselves. Podcasting has been shown to extend the use of most different learning styles<sup>6</sup>.



Most lectures offer the combination of primarily passive, receptive styles of learning



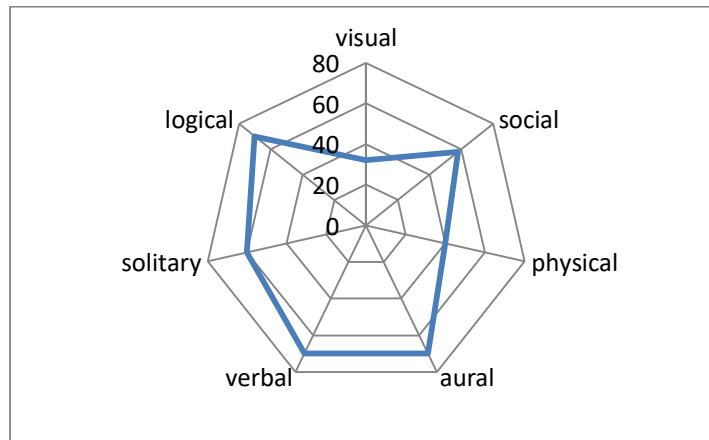
Classroom discussions are better by providing more opportunities of using different style

<sup>3</sup> G. G. Artyushina; O. A. Sheypak y R. S. Golov, Podcasting as a Good Way to Learn Second Language in E-learning. ACM International Conference Proceeding Series. 2017. 51-55 doi:<http://dx.doi.org/10.1145/3026480.3029590>

<sup>4</sup> G. Artyushina y O. A. Sheypak, “Mobile phones help develop listening skills”, Informatics, Vol: 5 num 3 (2018). DOI:10.3390/informatics5030032 URL: <http://fr.slideshare.net/shjduarte/esl-classroom-podcasting>

<sup>5</sup> E. M. Ozhiganova, “Theory of generations by N. Howe and V. Strauss - opportunities for practical applications”, Business education in the knowledge economy num 1 (2015): 94-97. URL: <https://cyberleninka.ru/article/n/teoriya-pokoleniy-n-houva-i-v-shtrausa-vozmozhnosti-prakticheskogo-primeneniya/viewer>

<sup>6</sup> H. Gardner y T. Hatch, “Educational implications of the theory of multiple intelligences...”



Audio podcasting expands the use of most of the different learning styles

This fact served as the basis for additional research on learning styles. As the basis for the research we used Gardner's Theory about Multiple Intelligences<sup>7</sup>, and a test about learning styles (<https://www.learning-styles-online.com>).

Every person knows, sometimes unconsciously, that, for example, reading information is less efficient than listening to information in order to understand the particularities of some issue. Each person chooses different learning styles and techniques. Everyone has a mix of learning styles. Some styles are dominant, others require a lot of effort and less comfortable. Some teaching approaches study the styles and try to develop less dominant styles. We suggested that using dominant styles we can develop professionally oriented skills. By recognizing and understanding students' learning styles, we can modify the process of teaching ESL in order to increase efficiency of teaching and meet the new challenges.

Gardner defines intelligence as "the capacity to solve problems or to fashion products that are valued in one or more cultural setting"<sup>8</sup>. He formulated a list of seven intelligences. This new outlook on intelligence differs greatly from the traditional view, which usually recognizes only two intelligences, verbal and computational. Still even nowadays, we can often meet the approach used mainly in schools, when children are supposed to be humanitarian or technical; their further way of education can be chosen basing on this approach. The eight intelligences Gardner defines are<sup>9</sup>: Logical-Mathematical Intelligence - consists of the ability to detect patterns, reason deductively and think logically. This intelligence is most often associated with scientific and mathematical thinking, very close to traditional computational intelligence. Linguistic Intelligence - involves having a mastery of language. This intelligence includes the ability to effectively use language to express oneself. It also allows one to use language as a means to remember information. Spatial Intelligence (corresponds to visual style of learning) - gives one the ability to manipulate and

<sup>7</sup> T. Brualdi y C. Amy "Multiple Intelligences: Gardner's Theory," Practical Assessment, Research, and Evaluation: Vol: 5 (1996): Article 10. Available at: <https://scholarworks.umass.edu/pare/vol5/iss1/10>

<sup>8</sup> T. Brualdi y C. Amy, "Multiple Intelligences: Gardner's Theory..."

<sup>9</sup> E. Hunt, "Multiple Views of Multiple Intelligence", Contemporary Psychology, Vol: 46 num 1 (2001): 5-7. <https://doi.org/10.1037/002513>

create mental images in order to solve problems. A student prefers using pictures, images, and spatial understanding. Musical Intelligence (corresponds to aural style of learning) - encompasses the capability to recognize and compose musical pitches, tones, and rhythms. Bodily-Kinesthetic Intelligence corresponds to physical style of learning) - is the ability to use one's mental abilities to coordinate one's own bodily movements. This intelligence challenges the popular belief that mental and physical activities are unrelated. The Personal Intelligence - includes interpersonal feelings and intentions of others. Students prefer to learn in groups or with other people. Intrapersonal intelligence - the ability to understand one's own feelings and motivations. Students prefer to work alone and use self-study. Naturalist intelligence designates the human ability to discriminate among living things (plants, animals) as well as sensitivity to other features of the natural world (clouds, rock configurations). Though, there are many different views on this theory<sup>10</sup>, we chose it as basic for our research aimed at finding the particularities which make new generations differ from the previous.

Our hypothesis was that the formation of a particular person's learning style occurs in childhood, before or at the early stages of school, or is even transmitted at the genetic level, that is, at the age of 18-22 years, when a student is studying at a higher educational institution, learning styles are already formed. However, learning styles probably do change over the course of a lifetime due to environmental influences (for example, the prevalence of audio - visual information). This process is long- term, time- consuming, and the amount of time and effort that can be spent on changing the learning style is too huge to spend. A new style of learning cannot be guaranteed to become dominant, especially if there was no predisposition and the effectiveness of training is not guaranteed.

Since it is not effective to change the style of learning (to teach an audio-visual student to think logically), it is necessary to change the technologies of the pedagogical process, adapting them to the needs and learning styles already formed in a particular student. This means that at the stage of formation of educational groups we should conduct tests, which reveal not only the level of formation of skills and the level of foreign language proficiency, but the student's propensity to cognitive cognition using a certain style of learning. Since the learning style can change under the influence of the environment (educational, social, cultural) - it is necessary to conduct testing at certain time intervals (bachelor's, master's), the same student may show different results. The environment changes general trends, therefore, it is necessary to change not only the content of training for a particular student, but also the content of training of the entire system of training of technical specialists in non-linguistic universities.

180 students of different levels (bachelors and masters levels) and types of education (full time, part time, distant) took part in our research (Table 1). We used free learning styles inventory test (<https://www.learning-styles-online.com>). Students were supposed to answer 70 questions to gain an understanding of personal learning styles. Table 1 shows the average values that characterize different learning styles.

In 2012 we paid attention to the fact that all students had different preferences in learning styles. Among full time students most student (10,8 and 13,6) relied on their logical intelligence. The distribution of preferences among other learning styles was practically

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<sup>10</sup> N. L. Zhurbenko, "Modern pedagogical technologies used to improve the efficiency of teaching foreign languages to students of technical specialties", World of Science. Pedagogy and psychology, [online] num 2 Vol: 6 (2018). Available at:<https://mir-nauki.com/PDF/50PDMN218.pdf> (in Russian).

equal, and the numbers were not significantly different among visual, verbal, aural and physical styles. We had practically as many students who prefer verbal learning style as students who prefer aural style. We had to combine different styles of learning and find a method, which could possibly suit the needs of all students with different styles of learning.

In 2020, we paid attention that students starting the process of education started to show preferences in learning styles, which were slightly different from those finishing education. We implied that the learning style can change under the influence of the environment (educational, social, and cultural).

We suggested that students of technical specialties may have, in the conditions of daily use in everyday life of a large number of gadgets and technologies, formed learning styles that differ from those used by previous generations and which were accordingly incorporated into the higher education programs of professionally oriented foreign language in the beginning of the 21<sup>st</sup> century<sup>11</sup>. Since that time the generations may have changed.

Explanation	form of education	quantity	Learning style (average value)						
			visual	verbal	aural	physical	logical	social	solitary
First year bachelors, 2012	full	63	10,8	11,6	11,8	11,5	10,8	10,8	10,7
	parte	13	8,4	9,0	11,0	11,2	8,4	14,3	9,0
	Dist.	30	10,9	10,2	9,6	10,8	10,7	11,6	10,9
First year masters, 2012	full time	74	11,5	12,0	10,7	11,3	13,6	13,5	10,7

Table 1  
2012 research results (first year students groups in focus)

<sup>11</sup> B. Shatto, "Moving on From Millennials: Preparing for Generation Z", The Journal of Continuing Education in Nursing Vol: 47 num 6 (2016): 253-254 <https://doi.org/10.3928/00220124-20160518-05>

We have decided, along with other researches being conducted in MAI<sup>12</sup> in order to make the process of teaching foreign languages more effective, to repeat the test on the basis of Garner's theory. Our assumption was supported with the theory of generations, which has become widespread in the system of professional training, as it explains the features of the new generation, which is now becoming the basis of society.

There are some works, which aim at equipping college-level instructors with ways to relate to and support the newest generation of learners. It is crucial to understand the preferences of the Generation Z so that proper channel of communication is established and good environment is created in the educational organization. They prefer transparency, self-reliance, flexibility and personal freedom are non-negotiable aspects of Generation Z. They must have enough independence to prove themselves and earn immediate recognition. They prefer in-person or face to face communication and want to take them seriously. These characteristics really affect the way of communication, the educational behavior and learning styles.

There is a division of skills that are taught in educational institutions at the moment on hard skills and soft skills. Sometimes the division is not that strict. It is assumed that soft skills are supposed to ensure the educational system flexibility and readiness of students for the constantly changing situation in the economy, in society and in professional activities, respectively. Learning to set clear goals, interact with others, find new opportunities, offer different solutions to problems - all these soft skills have already become necessary<sup>13</sup>. However, it is necessary to recognize the obvious fact, soft skills cannot provide the solution of the goals to ensure the efficiency of education in isolation from hard skills<sup>14</sup>. The process of learning hard skills also changes depending on the characteristics of the students.

We decided to reconsider the results of 2012 research from a different point of view, if the survey which took place in 2012 had an aim of analyzing learning styles from the point of Gardner eight intelligences, now we wanted to analyze intrapersonal intelligence and personal intelligence - the ability to understand feelings and motivations, whether our students prefer to work alone, use self-study or study in groups.

Last year 50 students (bachelors) of different types of education (full time, part time) took part in our research this year and 16 students (masters full time). (Table 2, 3). We used free learning styles inventory test (<https://www.learning-styles-online.com>). Students of the supposed new generation were supposed to answer 70 questions to gain an understanding of personal learning styles as the student of the previous educational generation did 8 years ago.

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<sup>12</sup> I. G. Anikeeva y M. N. Ovsyannikova, "Training lecturers of technical universities for interdisciplinary communication in a foreign language within the system of continuing professional development. World of Science", Pedagogy and psychology, num 3 Vol: 6 (2018): Available at: <https://mir-nauki.com/PDF/78PDMN318.pdf> (in Russian).

<sup>13</sup> M. R. Zheltukhina; N. V. Bondareva; L. L. Zelenskaya; I. G. Anikeeva; L. E. Malygina y A. V. Chistyakov, "Media Promotion Role of Economic Vocabulary: Specific Features and Functions in Presentation and Advertisement", Online Journal of Communication and Media Technologies. Vol: 9 num 2 (2019). DOI: 10.29333/ojcm/5733

<sup>14</sup> V. Zakharova, "A. Students of generation Z: reality and the future", Scientific works of the Moscow University for the Humanities num 4 (2019): 47-55 URL: <http://journals.mosgu.ru/trudy/article/view/1013>



The comparison results are shown below in Table 3. Comparing the test results of undergraduate students first year full-time training positions social (traditional) learning style and solitary learning style, we obtained the data shown in Table 4. Results students part-time attendance, combining work and study, were not considered, since these groups are not always students one year birthday.

Explanation	Form of education	Quantity (students)	Learning style (average value)						
			visual	verbal	aural	physical	logical	social	solitary
First year bachelors	full time	35	11,8	11,7	11,7	10,4	12,1	13,9	12,1
	part time	15	9,9	9,1	13,3	9,7	10,2	14,9	9,7
First year, masters	full time	16	10,8	11,5	10,4	10,0	13,0	13,6	8,5

Table 2  
2020 research results (first year students groups in focus)

Explanation	Year	Learning style (average value)						
		visual	verbal	aural	physical	logical	social	solitary
First year, bachelors, full time	2020	11,8	11,7	11,7	10,4	12,1	13,9	12,1
	2012	10,8	11,6	11,8	11,5	10,8	10,8	10,7

Table 3  
Comparison research results (first year bachelors groups in focus)

Year of research	Course	Generation	form of education	quantity (students)	Social (students)	%	Solitary (students)	%
2012	1	"Y"	Full time	63	45	71	18	29
2020	1	"Z"	Full time	35	21	58	14	42

Table 4  
Comparison research results

The results show that the number of students preferring solitary type of education in 2020 increased in comparison with number of students in 2012. At the same time we see decrease in number of students preferring social learning styles. We can witness a growth of number of students who like independent autonomous aimed at their own goals style of learning. The number of students who prefer solitary style of education tends to grow, thus we can state that Z generation is now starting the education in colleges and universities nowadays. The solitary style of education has to be reflected in the methodology in case we want the educational system to be student-oriented and effective.

As we considered the results of our new survey we realized the necessity of introduction into the learning process some new approaches which can answer the new needs of students, new requirements of the new generation and would be more universal from the point of view of reaching sustainability, quality of education. New goals of learning through life and learner autonomy were set and we wanted to find a way of meeting the new goals through modifying the way we use the traditional methods and building an individual path of teaching considering all the particularities of a modern generation Z student<sup>15</sup>. We have come to the conclusion that changing teaching materials is not as effective as changing the way of using it. We decided to promote the development of learner autonomy through building an individual path of education. This way can satisfy both social students as the group lessons and group tasks are still widely used and solitary students<sup>16</sup>. Many educational institutions now use information technology in their work<sup>17</sup>. Various forms of

<sup>15</sup> Kathleen A. J. Mohr and Eric S. Mohr, "Understanding Generation Z Students to Promote a Contemporary Learning Environment", *Journal of Empowering Teaching Excellence*: Vol: 1 Iss 1 (2017): Article 9. DOI: <https://doi.org/10.15142/T3M05T> Available at: <https://digitalcommons.usu.edu/jete/vol1/iss1/9>

<sup>16</sup> T. I. Leontieva y S. N. Kotenko, "Features of teaching a foreign language to generation Z: traditions and innovation", *Territory of new opportunities. Bulletin of the Vladivostok state University of Economics and Service*. 2017. Vol: 9 num 1 (2017): 152-158

<sup>17</sup> Z. Y. Liu; N. Spitsyna; S. Zubanova y A. Vekilova, "Using Internet Resources for Remote Language Learning", *International Journal of Emerging Technologies in Learning*. Vol: 15 num 13 (2020): 22-33. DOI: 10.3991/ijet.v15i13.14653. 22-33

distance learning are very popular<sup>18</sup>. We consider distance learning not only as a different form of communication, it also modifies the content and the principles of education, which should reflect new trends in the use of a foreign language, motivate students with an applied nature and gives a perfect opportunity to implement principles of learner autonomy in to every day teaching-learning process.

Another important part of students' activity is the work supposed to be done out of class autonomously. Out-of-class work of students according to the studying plans can be half or more of the entire teaching time for the discipline. One of the main conditions of effectiveness of studies is implementation of effective independent work of students. To reach this aim a language teacher should: specify the terms and time limits of fulfillment the task, as well as the volume and example of all independent works; clearly set the purpose of each task and the expected result; recommend to use a variety of learning tools, such as authentic audio and video materials, networking technologies; carry out systematic control; assess the level of acquired knowledge, skills and abilities; stimulate and encourage students to improve their knowledge; take into account the results of independent work when passing tests and exams.

These recommendations correspond with learner autonomy principles and student-oriented approach of the organization of the teaching ESL process.

## Conclusion

Planning work, including class work and the work students are supposed to do independently, it is necessary to consider the following aspects: student-oriented approach should be introduced, materials should have an applied nature, be as modern as possible, tasks must be accurately timed; the objective of the assignment must be clearly stated; students no longer need external motivation, pedagogical technology of differentiated teaching can be applied as it helps to promote learner autonomy. Students prefer to be involved into the process of setting goals, planning and evaluating their studies. Modern students specializing in all spheres are mostly ready to become autonomous learners and our task is to implement the elements of learner's autonomy into the process of teaching professionally oriented foreign languages.

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