Yesenina N.Y. Application of ICT for foreign language educational material memorizing by engineering students Research result: Pedagogic and psychology of education. Vol. 3, №2: 16-20.

16

Yesenina N. Y.

APPLICATION OF ICT FOR FOREIGN LANGUAGE EDUCATIONAL MATERIAL MEMORIZING BY ENGINEERING STUDENTS

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Abstract

Modern linguodidactics of society and education informatization stage pays significant attention to the correspondence between methods of training and aids of training – the components of foreign languages teaching methodology system. Herewith, when we discuss the aids of foreign language training we mean mainly education informatization facilities which posses not only functionalities but also linguodidactical capabilities. Such scientific investigations are very urgent for foreign language training in engineering universities as their results are able to intensify that specific learning process. The present paper contains the theoretical investigations results as well as the test-teaching results dedicated to foreign language training methods full-fledged realization by means of linguodidactical capabilities of education informatization facilities. The theoretical part of the present paper presents eleven linguodidactical capabilities of education informatization facilities. The methodical recommendations for language teachers on overcoming the difficulties of memorizing of non-specific for science and technology language educational material by engineering students are also presented here. The practical part of the article is devoted to the description of the English language test-teaching process of engineering students and to the results of this test-teaching. The data proving the positive dynamics of English proficiency of engineering students after their test-teaching as well as the statistical characteristics proving the data validity by means of distribution-free test chi-square χ^2 are given. Finally, the advantages of foreign language training methods realization by means of linguodidactical capabilities of education informatization facilities are accentuated.

Keywords: foreign language training; methods of training; engineering university; ICT; education informatization facilities; linguodidactical capabilities.

Yesenina N. Y.

ПРИМЕНЕНИЕ ИКТ ДЛЯ ЗАПОМИНАНИЯ ИНОЯЗЫЧНОГО УЧЕБНОГО МАТЕРИАЛА СТУДЕНТАМИ ТЕХНИЧЕСКИХ ВУЗОВ

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Аннотация

Современная лингводидактика этапа информатизации общества и образования уделяет существенное внимание соотношению методов и средств обучения как компонентов методической системы обучения иностранным языкам. При этом, рассуждая о средствах обучения иностранным языкам, преимущественно подразумеваются средства информатизации образования, обладающие не только функциональными, но и лингводидактическими возможностями. В условиях иноязычной подготовки технического вуза результаты таких исследований принимают ярко выраженную актуальность, так как позволяют существенно интенсифицировать учебный процесс. Настоящая статья содержит результаты теоретических исследований и опытной работы, посвящённых определению способов достижения полноценной реализации методов обучения иностранному языку в техническом вузе с помощью лингводидактических возможностей средств информатизации образования. В теоретической части статьи представлены одиннадцать лингводидактических возможностей средств информатизации образования, а также методические рекомендации для преподавателя по преодолению трудностей у студентов технических направлений, связанных с запоминанием несвойственного для технических областей языкового учебного материала. Практическая часть статьи посвящена описанию опытного обучения английскому языку студентов технических направлений и его

НАУЧНЫЙ РЕЗУЛЬТАТ
RESEARCH RESULT

Yesenina N.Y. Application of ICT for foreign language educational material
memorizing by engineering students Research result: Pedagogic and psychology of education.
Vol. 3, №2: 16-20.

17

результатов. Приведены данные, доказывающие положительную динамику изменения уровня владения английским языком после введения экспериментального фактора, а также приведены статистические характеристики, доказывающие достоверность результатов с помощью непараметрического критерия χ^2. В заключении выделены преимущества реализации методов иноязычной подготовки с помощью лингводидактических возможностей средств информатизации образования.

Ключевые слова: иноязычная подготовка; метод обучения; технический вуз; ИКТ; средства информатизации образования; лингводидактические возможности.

Introduction

Full-fledged foreign language training methods realization in engineering universities depends on the use of information and communication technologies (ICT) facilities. Education informatization as a scientific discipline is trying to find out different combinations of work modes of educational informational interaction agents to bring into optimal correlation methods, learning process conditions and target audience.

While discussing the training methods we have used the classification according to the activity approach which takes into account acting, stimulating and controlling components of activity [13, 14]. But we also have added to these components the preparatory one to depict the extra-class organizational activity of a language teacher. As the result we are discussing the following training methods:

- professional and pedagogical methods;
- educative and cognitive methods;
- stimulating and motivating methods;
- controlling and directive methods.

The organization of new language material drill, active language practice and continuous control without students' overload and overstrain caused by memorizing of huge amounts of non-specific information is of primary importance in engineering universities. That's why the issues of ICT usage for considering psychological aspects of foreign language material learning are imperative and urgent for the enhancement of foreign language training in engineering university.

Purpose

The purpose of the paper is to define the ways to reach the full-fledged realization of foreign language training methods in engineering universities by means of linguodidactical capabilities of education informatization facilities, to develop methodical recommendations for language teachers on considering the psychological aspects of foreign language material learning and memorizing and to check the effectiveness of the offered system of measures in test-teaching.

Materials and Methods

Pedagogy as a science has different performance criteria. We have assessed the quality of engineering students foreign language training by testing their English proficiency before and after experimental factor putting into operation.

We used theoretical as well as empirical methods of investigations. Theoretical methods of investigations were based on summarizing of pedagogical and psychological foundations, accumulating and systemizing of Russian and foreign experience in linguodidactics and education informatization, expert assessment of linguistic informational resources etc. We used the following empirical methods of investigations: observing, conversation, computerized testing, statistical methods as well as test-teaching of engineering students.

Fifty eight engineering students were taught English on the base of the methodical recommendations on training methods realization by means of linguodidactical capabilities of education informatization facilities. Their English proficiency before and after test-teaching were assessed with help of lexica-grammatical test according to Common European Framework of Reference.

The data validity was proven by statistical methods with the help of statistical program package STADIA; electronic worksheets, statistical characteristics by means of distribution-free test chi-square χ^2 and a bar-graph were done.

ICT facilities and education informatization facilities

ICT facilities have not only unique functionalities but also didactical capabilities. Therefore it is applicable to consider some of them as education informatization facilities [5, 6]. We have agreed with the scientist assuming multimedia, hypertext, hypermedia and virtual reality facilities to be the most perspective from the linguodidactical point of view [1, 2, 4, 8, 9, 11, 12]. After having analyzed the specific peculiarities demonstration of didactical capabilities of education informatization facilities in interrelated reading, writing, listening and speaking teaching [3, 10, 12] we revealed their linguodidactical capabilities i.e. capabilities which have the following functions [5]:

− intensification of foreign language training at all levels and profiles of education,

НАУЧНЫЙ РЕЗУЛЬТАТ
RESEARCH RESULT

Yesenina N.Y. Application of ICT for foreign language educational material memorizing by engineering students Research result: Pedagogic and psychology of education. Vol. 3, №2: 16-20.

18

– foreign language training enhancement in order to prepare the secondary language personality capable to socialize within highly-developed poly-lingual socio-cultural information and communication environment;

– creating of pedagogical technologies oriented on learners' intellectual development, learners' skills formation of information and speech self-activity, learners' stable motivation to produce their own knowledge in the form of intellectual linguistic information resource.

Linguodidactical capabilities of education informatization facilities

The linguodidactical capabilities of education informatization facilities having primary importance for foreign language training in engineering universities are likely to be the following [5]:

– intellectualization of interactive man-machine dialogue between a foreign language learner and an education informatization facility causing mutual answers (quasi-communication between a learner and an expert-teacher);

– interactive foreign language dialogue with a remote communicator mediated by ICT usage which is a real speech communication improving all kinds of speech activities;

– computerized animation of learning situations of foreign language speech communication, as well as presenting these situations by language games with an opportunity of being a dialogue or a polylogue communicator to influence on game's scenario;

– computerized visualization of invisible man's articulatory processes and graphic image of audio-record with the help of speech signal graph in the monitor's screen;

– automated speech recognition: oral speech – an etalon voice, a learner's voice and any speaker's voice and sayings for the follow-up listening, comparison and assessment, writing speech – texts, formulae, tables и etc. for the follow-up linguistic processing by a man or an automated system, as well as writing speech transformation into oral speech and otherwise;

– automated linguistic processing (linguistic analyses, editing, reviewing, abstracting, translation) of speech;

– presenting of language educational material in all formats (not only symbols, graphs, texts, but also audio-, video-information, animation) which provides two-sensory (audio and video) influence on sense organs expressed in accelerated perception, processing and analyses of information;

– archiving, storage, access, transfer, replication, presentation, etc. of rather large volumes of foreign language linguistic and extralinguistic information presented in any format on a removable media or distributed on the Internet;

– automation of information retrieval foreign language activity determining the cognitive and speech aspects of foreign-language information interaction by means of automation of routine operations not related to speech activity;

– automation of language material drill (speech activity's means and actions) with the opportunity of unlimited execution of an exercise or a training task, return to some fragments of an exercise as well as exercises results processing;

– automation of the processes of information and methodological support, education organizational management and learners' results control including design automation, operational planning, correction and control of the learning process, automation of information and methodological activities and information interaction between educational process participants by means of local and global computer networks.

Psychological aspects of foreign language material memorizing

A man notoriously has visual, aural and motor aspects of memory in different extent of their development and in different ratio depending on age. The psychological investigations has shown [7] that the levels of development of different memory aspects coincide less commonly when a student is elder in comparison with the indicators of this very student's younger periods. Predominately developed aural memory makes up favorable conditions for foreign language learning, especially for oral speech (speaking and listening). But people with the strongly and sometimes even one-sidedly developed eye receptors prevail. That's why multimedia and hypermedia language educational material influencing on visual and aural organs is of primary importance; also they stipulate the educative and cognitive methods realization.

The combined influence of multimedia and hypermedia education informatization facilities increasing stimuli coefficients affects long-term memory, provides deep analyses of information and its perception and contributes involuntary memorizing of language material without surplus mental load and strain.

It is necessary to take into consideration that educational language material (phonemes, letters, intonoms, words, word combinations, phrases, grammatical forms and structures) should be similar

НАУЧНЫЙ РЕЗУЛЬТАТ
R E S E A R C H   R E S U L T

Yesenina N.Y. Application of ICT for foreign language educational material memorizing by engineering students Research result: Pedagogic and psychology of education. Vol. 3, №2: 16-20.

19

to oral colloquial speech, reflect real speech situations and be a dialogue or a polylogue. Thus computerized animation of speech communication situations as well as presenting them by language games with an opportunity of being a player of a game's scenario is so significant; it also stipulates the educative and cognitive as well as stimulating and motivating methods realization.

Speaking about oral speech pace in language learning informational resources, we should mark their functionality to accelerate and decelerate artificially natural speech pace for the follow-up linguistic analyses. By means of automated recognition and processing of oral speech patterns from different sources the educative and cognitive methods are realized. When the pace is too fast (more than 400 syllables per minute) the learners have no time to analyze the text content. The decelerated speech pace (120 syllables per minute) relaxes learners' attention and impedes quick reaction capability which influences negatively on the information perception [7]. More, unnatural speech pace misrepresents intonation. So a teacher should replay text, its complex structures and fragments not more than 2-3 times.

Intensive speech pace development and phonetic and prosodic skills formation with the help of such educative and cognitive methods as comprehension, drill and practice are reached by computerized visualization of invisible man's articulatory processes and graphic image of audio-record.

Continuous actualization of educational, methodical, controlling and diagnostic materials and their adaptation to the learners' needs are all foreign language teachers' great concern. Professional and pedagogical methods realization is provided by automation of the processes of information and methodological support, linguistic processing intellectualization as well as archiving, storage, access etc. of educational language material presented in any format.

As for the usage of language educational information formats a foreign language teacher should follow these instructions:

• graphic information usage is for language material semantization in the process of lexico-grammatical skills forming and for stated facts logical path creation in learners' memory;

• audio information usage is for creating clear aural notions in memory and for aural speech comprehension;

• animation and visual information usage is for hearing and seeing imagery and the follow-up speech situations learning.

In spite of the fact that visual and aural organs have different delivery capacity of information units per minute a foreign language teacher is able to combine information of different formats as simultaneously as with very short time intervals for forming of deep ties between two and more stimuli.
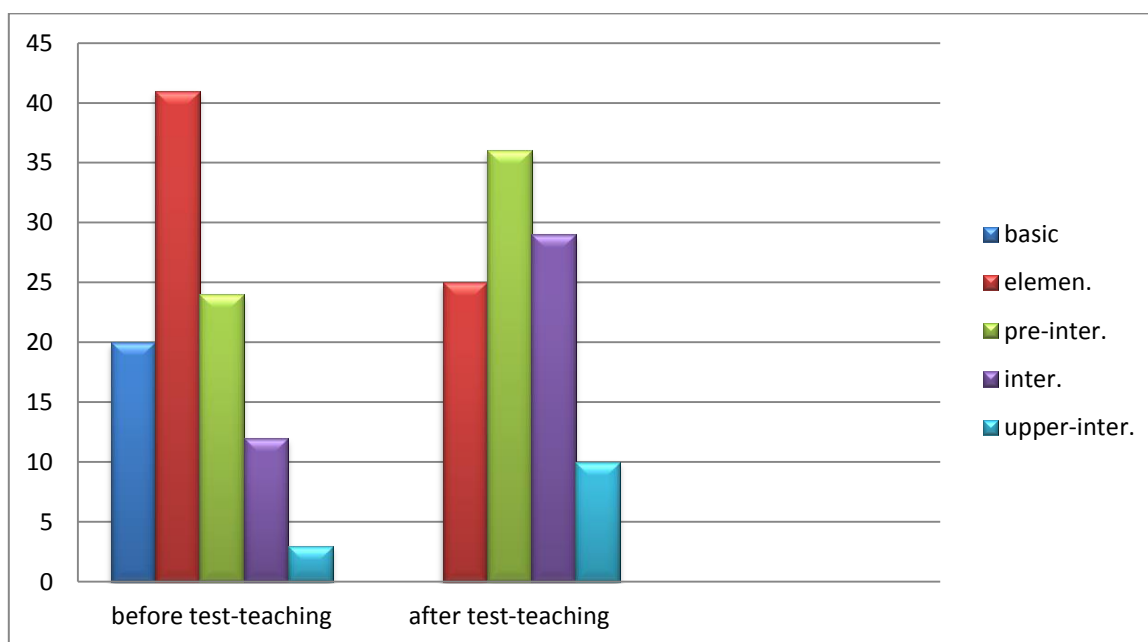

Fig. Bar-graph of the English language knowledge level by the engineering students before and after test-teaching
Рис. Гистограмма уровней владения английским языком студентами технических направлений до и после опытного обучения

НАУЧНЫЙ РЕЗУЛЬТАТ
RESEARCH RESULT

Yesenina N.Y. Application of ICT for foreign language educational material memorizing by engineering students Research result: Pedagogic and psychology of education.
Vol. 3, №2: 16-20.

20

Thus, man's aural and visual peculiarities emphases the necessity of presenting educational language material in all formats, visualization of articulatory processes, feedback between a learner and an education informatization facility, interactive man-machine intellectualization which realize the educative and cognitive as well as controlling and directive methods.

Findings and Discussions

Comparative testing results of English proficiency change of engineering students before and after experimental factor putting into operation are in a bar-graph of Figure № 1. Abscissa axis shows English language levels. Ordinate axis shows the number of students (%) falling into the levels.

The bar-graph analysis has concluded that there are the differences between their English proficiency before and after test-teaching. The statistical comparison of the sampled data before and after test-teaching according to chi-square χ^2 shows that these samples do not belong to one general population and the differences between them are not of random character. The value of $\chi^2_{empirical} = 37, 4$, level of significance 4,828E-5, level of freedom = 4. The value of $\chi^2_{homogeneous} = 70, 71$, level of significance 9, 434E-6, level of freedom = 4. So, it has been proved that the foreign language training methods realization based on linguodidactical capabilities of education informatization facilities is highly effective.

Conclusions

Finally, appreciating the effectiveness of linguodidactical capabilities of education informatization facilities in foreign language training, we are to accentuate their advantages in the following areas:

- forming of deep ties between stimuli of aural and visual organs;
- reducing of mental load and mental strain;
- taking into account the learners' peculiarities of student age.

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