МЕТОДОЛОГИЯ И ТЕХНОЛОГИЯ ПРОФЕССИОНАЛЬНОГО ОБРАЗОВАНИЯ В ЭПОХУ ЦИФРОВОЙ ТРАНСФОРМАЦИИ

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PART-TIME ADJUNCTS' FOREIGN LANGUAGE SCIENTIFIC COMMUNICATION SKILLS DEVELOPMENT ON THE BLENDED LEARNING PRINCIPLES

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Abstract. Under conditions of higher military education digitalization there is an urgent problem of finding the balance between its potential and negative consequences when the military access to global Internet and personal digital devices employment are limited. One of the ways to solve the problem is to implement blended learning principles - the principles of consistency, visibility, practical implication, the continuity principle, and the principle of support – within the framework of a modified model combining elements of the Flex Model, the Virtual Model and the Supplemental Model. This model is implemented within the inner protected information and telecommunication infrastructure and fully adapted to specific conditions of a military higher school. The aim of the research is to prove the efficiency of the model based on the blended learning principles which contribute to successful development of part-time adjuncts' foreign language scientific communication skills in a military higher school such as: foreign language proficiency, thinking efficiency, communicative competences, and self-management. To solve the problem the following methods were used: the comparative analysis, synthesis, theoretical systematization and generalization, declarative and formative experiments, pedagogical observation, test conducting, qualitative and quantitative analysis, mathematical and statistical methods of empiric data processing (χ^2 Pearson test). The pilot base was N.E. Zhukovsky and Y.A. Gagarin Air Force Academy (Voronezh). 24 part-time adjuncts of the first year took part in the experiment (PG = 12, CG = 12). The result of the experimental research showed the effectiveness and purposefulness of the blended learning principles implementation during part-time adjuncts' foreign language scientific communication skills development when preparing for PhD exam in English. The further survey of the problem deals with the search and scientific justification of new blended learning principles aimed at full-time and part-time adjuncts' intellectual and creative abilities development, working out intensification mechanisms in the context of educational transformations in the XXI century society.

Keywords: blended learning, part-time adjuncts, foreign language scientific communication, the discipline "Foreign language", a military higher school.

Introduction. The Russian Federation Armed Forces development for the country's national security requires the further enhancement of the military education system including coherent implementation of its military and scientific potential. The science's ability and commitment "to influ-

ence the processes of strengthening the country's defenses" (Astanin, 2013) improving the Armed Forces' combat power are determined first of all by the quality of vocational training at all levels of military professional education including post-graduate one. The strategy of adjuncts' advanced training is made up of the learning process intensification on the basis of the military higher school digitalization in the context of implementation of the prioritized project "The contemporary digital educational environment in Russian Federation" (2016) and the National program "Digital economics of Russian Federation" (2017).

In this regard specialists have defined a spatial vector of post-graduate learners' vocational training enhancement based on the blended learning principles, achievement of meaningful personalized professional adjuncts' training within educational and scientific base of a military higher school.

Originally the term "blended learning" was not clearly identified. In scientific literature terms with common meanings were simultaneously used: "blended learning", "hybrid learning", "technology-mediated instruction", and "mixed-mode instruction" (Newcombe, 2011; Norberg, Dziuban & Moskal, 2011; Ocak, 2011; Hunter, Austin, 2020 and others). In 2006 "The handbook of blended learning" was issued in which the term "blended learning" was clearly defined as a combination of face-to-face learning controlled by computer, "a range of possibilities presented through a mixture of Internet and E-mass media and forms where physical presence of a teacher and a learner is required" (Graham, Bonk, 2006).

Blended learning is based on distance learning, face-to-face learning and online learning. Depending on the learning process richness in online technologies of content delivery and character of participants' interaction experts offer several models of blended learning. For example, H. Stacker and M. Horn (Staker, Horn, 2012) identify four models: the Rotation Model (regular rotation of traditional classroom and E-lessons); the Flex Model (the main part of the educational material is studied online, the students have an opportunity to consult the teacher in a face-to-face format); a La Carte Model (a student can choose additional E-courses behind the basic learning, this type of model is for those students whose studying interests are out of traditional educational program); the Enriched Virtual Model (at the beginning the lessons are conducted in a traditional format, then students go on learning the material and interacting with the teacher in an online way).

According to S. Twigg (Twigg, 2003) there are also the Replacement Model (the bigger part of the educational material is studied in an E-format, the teacher coordinates the learning process, provides support in case of constraints, holds consultations); the Supplemental Model (the bigger part focuses on traditional classroom learning which is added with E-resources work); the Emporium Model (the learning process is carried out on a special website of a department and in a specially equipped computer class); the Buffet Model (the students can autonomously combine classroom and E-lessons depending on their educational needs).

A. Alammary and A. Carbone (Alammary, Carbone, 2014) classify types of blended learning according to the degree of impact: with a low impact degree – online lessons are added to the current course; with an average impact level – online activity is developed to change the previous one; with a high impact level – a blended module is developed from the very beginning, or face-to-face module or web-module as a module of blended learning is reprojected.

In the overseas educational system the most successful blended learning employment is experienced by the greatest universities such as University of Central Florida, Arizona State University, Georgia State University, the New College of Haddersfield, College of Manchester etc. In Russian system of higher education such an experience is possessed by School of Advanced Studies (Tymen State University), Kant Baltic Federal University, Ural Federal University etc.

In Russian military higher school including N.E. Zhukovsky and Y.A. Gagarin Air Force Academy the inner protected information and telecommunication infrastructure is dynamically being developed. Due to the military access limitations to global Internet and personal digital devices employment the following problem arises: how to find the balance between the positive and negative consequences of digitalization in the educational process of a military higher school. One of the ways to solve the problem is to implement blended learning principles on the basis of such a combination of the learning models that wouldn't contradict the normative documentation of Russian Federation Ministry of Defense. Employment of the modified model based on the blended learning

principles adapted for the military higher school educational process is quite possible within the discipline "Foreign language" studied by part-time adjuncts during preparation for the PhD exam. The aim of the research is to discover the peculiarities of the blended learning principles implementation during part-time adjuncts' foreign language scientific communication skills development when studying the discipline "Foreign language".

Materials and methods. The research was conducted in three phases. The first phase dealt with theoretical analysis of psychological and pedagogical works on the problem of blended learning implementation in a higher school educational process. At the second phase a declarative and formative experiment of part-time adjuncts' foreign language scientific communication skills development based on the blended learning principles was implemented. The third phase was devoted to analysis of experimental results. The pilot base was N.E. Zhukovsky and Y.A. Gagarin Air Force Academy (Voronezh). From 2017 to 2021 24 first-year part-time adjuncts (PG = 12, CG = 12) participated in the experiment.

Methods of comparative analysis, synthesis, systematization and generalization of theoretical statements, a declarative and formative experiment, pedagogical monitoring, testing, quantitative and qualitative analysis, mathematical and statistical methods of empiric data processing (χ^2 Pearson test) were employed in the research.

Diagnostics of the level of foreign language scientific communication skills development was carried out on the basis of a written lexical and grammar test, discussion, a report, a final essay; E. P. Torrance and J. P. Guilford's test, MMPI-II and R.B. Cattell's monitoring, "Self-management capacity" testing by N.M. Peisahov.

The hypothesis of the research was based on the suggestion that part-time adjuncts' foreign language scientific communication skills development will be more efficient if blended learning principles adapted to special conditions of a higher military school are implemented in the educational process.

Results. The discipline "Foreign language" is studied within an educational component of the adjuncts' scientific and pedagogical staff training program. The principle goal of learning the discipline is foreign language communication practical skills development and development of cognitive and research skills of gathering and processing scientific information in a foreign language for scientific (including international) activities within the major.

Adjuncts' foreign language scientific communication skills mean: knowing the peculiarities of scientific results presentation in an oral and written form when working in international research teams; lexical and grammar phenomena and terms necessary for working with foreign language scientific texts and communicating in a foreign language; contemporary methods and technologies of scientific foreign language communication; rules of communicative behavior in situations of international scientific communication.

Adjuncts should be able to follow the rules of scientific communication; read and understand authentic scientific literature in a foreign language, follow the rules of interpreting and summarizing scientific foreign language information; work with additional sources of information including foreign language Internet-resources; make reports on the basis of Power Point presentations in a foreign language on themes connected with their scientific work; make up a scientific conversation, understand and evaluate different points of view, seek common grounds among different viewpoints and beliefs; use dictionaries, reference literature and other sources of additional information.

Upon completion of the course the learners should speak a foreign language to the extent necessary to obtain information from overseas sources when solving scientific and educational problems; develop scientific foreign language texts analysis skills; learn different types of interpersonal and business foreign language scientific communication, various methods and technologies of processing a great amount of foreign language information to use it in the scientific and research activity; spelling, orthoepic, lexical, grammatical and stylistic standards of the foreign language, properly use them in all types of scientific speech communication orally and in writing.

Thus, part-time adjuncts' foreign language scientific skills development is determined by level of *foreign language proficiency* (correctness of spelling, orthoepic, lexical and grammar and stylistic standards employment in scientific oral and written communication); *thinking efficiency*

(creativity, logic, critical thinking, emotional intellect), *communicative competences* (success of communicative behavior during public presentation of a scientific report in a foreign language), and *self-management* (control of stress, emotions, general condition).

A pilot and control group was identified; the diagnostic tool was developed at the declarative phase of the experiment. The diagnostic methods were selected according to the criteria and their indicators of part-time adjuncts' foreign language scientific communication skills development presented in Table 1.

Table 1.

Criteria, indicators and methods of level identification of part-time adjuncts' foreign language scientific communication skills development

Criteria	Indicators	Methods
Foreign language proficiency	correctness of spelling, orthoepic, lexical and grammar and stylistic standards employment in scientific oral and written communication	A written lexical and grammar test, discussion, a report, a final essay
Thinking efficiency	creativity, logic, critical thinking, emotional intellect	E.P. Torrance and J.P. Guilford's test
Communicative competences	success of communicative behaviour during public presentation of a scientific report in a foreign language	MMPI-II and R.B. Cattell's monitoring
Self-management	control of stress, emotions, general condition	"Self-management capacity" testing by N.M. Peisahov

The reference level was identified. The declarative phase results of the experiment are shown in Table 2.

Table 2.

The results of level identification of part-time adjuncts' foreign language scientific communication skills development at the declarative phase (%)

Skills of part-time adjuncts' foreign language scientific communication	Pilot group			Control group		
	High level	Average level	Low level	High level	Average level	Low level
Foreign language proficiency	0	25	75	8,3	33,3	58,3
Thinking efficiency	8,3	33,3	58,3	0	25	75
Communicative competences	0	25	75	8,3	33,3	58,3
Self-management	8,3	25	66,7	0	25	75

The x^2 Pearson's test at the declarative phase was 0,026 (Table 3).

Table 3.

The x^2 Pearson's test at the declarative phase

Levels	f_{pj}	f_{cj}	f_{pj}- f_{cj}	$(f_{pj}- f_{cj})^2$	$(f_{pj}- f_{cj})^2/f_{cj}$
High	0,50	0,50	0,00	0,00	0,000
Average	3,25	3,50	-0,25	0,06	0,018
Low	8,25	8,00	0,25	0,06	0,008
Total	12	12	0		**0,026**

The purpose of the formative phase was to implement blended learning principles during part-time adjuncts' foreign language scientific communication skills development. The learning model for the pilot group officers was developed. It comprised elements of three types of blended learning: The Flex Model in which the main part of the educational material is studied remotely, adjuncts have an opportunity to consult the teacher personally during the introductory session; the Virtual Model in which the introductory session at the beginning of the course is conducted in a traditional format, thereafter adjuncts learn the educational material and interact with a teacher remotely through e-mail; and the Supplemental Model in which the main part of the time is spent in the format of traditional classroom learning during adjuncts' sessions that is added by the work with electronic resources.

Thus, the "Inverted class" technology was implemented: the part-time adjuncts worked at home in their educational online environment employing their own electronic devices with internet access, learn new or review the studied material on their specialty. The adjuncts' preparation for PhD examination in a foreign language included: reading and translating authentic scientific and technical literature in the special field (150–200 pages); writing the translation of authentic scientific and technical texts in the special field into Russian (10–15 pages); making up a glossary of the foreign language literature.

At face-to-face lessons the specialized terminology was reviewed, the adjuncts presented their reports and PP slides based on the literature studied.

The knowledge received during special literature reading was activated in the form of a mid-term test, a simulation game, a virtual scientific conference etc. Thereby *the principle of consistency* was implemented: first the adjuncts had to learn a new subject or phenomena on their own then to obtain detailed information from the teacher and after that to use new skills in practice.

In this case a significant role was played by electronic resources which under conditions of the closed information and communicative environment of a military higher school were specially developed E-course books, additional presentation materials (Power Point slides), educational audio- and video records approved at the department meetings, the department's local network where the adjuncts could find the necessary additional educational materials etc.

This contributed to implementation of *the principle of visibility* in the part-time adjuncts' blended learning. The contemporary technologies of e-learning allowed to create a knowledge basis for the discipline "Foreign language", its module and even its definite theme without internet access which is very critical under special conditions of a military higher school. There are E-course books with videos, schemes, tables, pictures, different types of communicative tasks which are very comfortable for learners to have them at hand and appeal to them at any time.

One of the most important blended learning principles is *the principle of practical implication.* In a specialized language laboratory the learners' practical skills were drilled, knowledge levels were monitored by testing and other interactive forms. At face-to-face lessons the entire arsenal of the department material and technical base was systematically involved in the part-time adjuncts' blended learning, such as:

- the software system NIBELUNG designed for employment in computer classrooms as an interactive multimedia environment for efficient interaction;
- the software SunRav Book Office 4.3 for work with E-course books;
- the software for work with files in textual formats (doc, docx, rtf, wps, odt and others), presentations (pdf, ppt, pptx) including audio and/or video materials (mp4, mp3, mkv, jpg and others); ABBYY Lingva, ABBYY FineReader 14 Standard;
- audio equipment with the option of CDs listening;
- video equipment with the option of CD and DVD watching; a laptop; a multimedia projector for presentations, a screen.

In the format of virtual scientific conference during classroom lessons the adjuncts demonstrated correctness of spelling, orthoepic, lexical and grammar and stylistic standards employment in scientific oral and written communication; a degree of creativity, logic, critical thinking, emotional intellect development; to what extent their communicative behaviour during public presenta-

tion of their scientific report in a foreign language was successful; how they could overcome stressful situations, control emotions and general condition. At face-to-face lessons individual work (individual listening comprehension tasks with individual educational tools employment – computer, headphones, microphone, individual work with special literature etc.) was alternated with the group one (scientific debates, reports and Power Point presentations discussion etc.).

Due to the fact that a great number of studying hours of part-time adjuncts' program are spent on learning the material within the self-study it was very important for adjuncts from the pilot group to be constantly involved in the educational process. Persistent gaps in learning negatively influenced its results. Online technologies being used out of the military higher school allowed the part-time adjuncts from the pilot group to continue learning under any conditions thus *the continuity principle* of blended learning was implemented during part-time adjuncts' foreign language scientific communication skills development.

In the period of preparation for the PhD examination in a foreign language a part-time adjunct had to stay in touch with the teacher in order to ask a necessary question. During the experiment it was carried out through E-mail. It wasn't necessary for a learner to wait for the next session or lesson to obtain relevant information as it happened in the control group. Thus, *the principle of support* was implemented as one of the most important ones in part-time adjuncts' blended learning.

As we see at the formative phase of the experiment the pilot group officers studied on the blended learning principles, the control group officers studied on the principles of the traditional approach.

Upon completion of the formative phase of the experiment we monitored the dynamics of part-time adjuncts' foreign language scientific communication skills development level (Table 4).

Table 4.

The results of level identification of part-time adjuncts' foreign language scientific communication skills development at the formative phase (%)

Skills of part-time adjuncts' foreign language scientific communication	Pilot group			Control group		
	High level	Average level	Low level	High level	Average level	Low level
Foreign language proficiency	33,3	58,3	8,3	16,7	33,3	50
Thinking efficiency	41,7	41,7	16,7	8,3	33,3	58,3
Communicative competences	33,3	50	16,7	16,7	41,7	41,7
Self-management	33,3	66,7	0	8,3	33,3	58,3

The x^2Pearson's test at the formative phase was 10,233 (Table 5).

Table 5.

The x^2 Pearson's test at the formative phase

Levels	f_{pj}	f_{cj}	f_{pj}- f_{cj}	$(f_{pj}- f_{cj})^2$	$(f_{pj}- f_{cj})^2/f_{cj}$
High	4,25	1,50	2,75	7,56	5,042
Average	6,50	4,25	2,25	5,06	1,191
Low	1,25	6,25	-5,00	25,00	4,000
Total	12	12	0		**10,233**

We noticed considerable positive difference between the pilot and control group: the high level in the PG before the experiment was shown by 4,2 % adjuncts, after the experiment – 35,4 %, in the CG – 4,2 % and 12,5 % accordingly; the average level in the PG was demonstrated by 27,1 %

before and 54,2 % officers after the experiment, in the CG – 29,2 % and 35,4 %; the low level was showed by 68,8 % the PG learners at the beginning of the experiment, after the work the indicators were decreased to 10,4 %, in the CG – from 66,7 % to 52,1 % (Fig. 1).

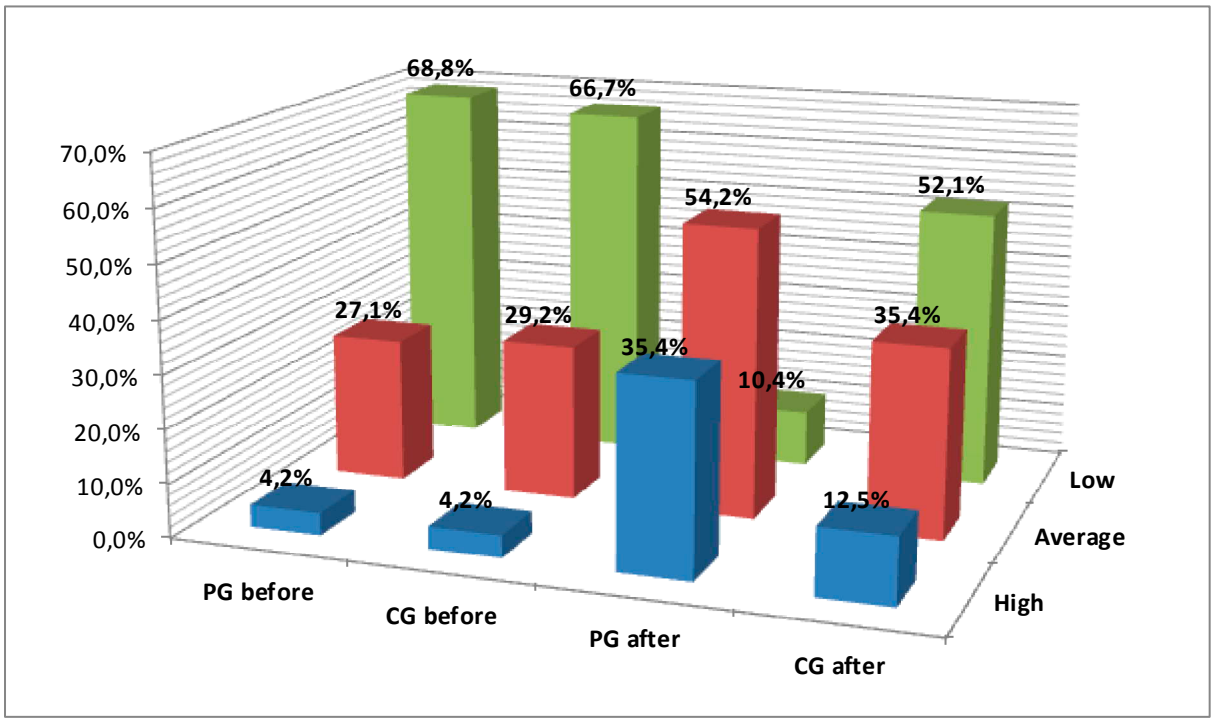

Fig. 1. The result of the experimental research of part-time adjuncts' foreign language scientific communication skills development based on the blended learning principles

Based on the formative experiment results analysis we came to the conclusion about efficiency and purposefulness of part-time adjuncts' foreign language scientific communication skills development based on the blended learning principles.

Conclusion. The study demonstrated the practical experience of part-time adjuncts' foreign language scientific skills development based on the blended learning principles when studying the discipline "Foreign language". Under conditions of the military access limitations to global Internet and personal digital devices employment the learning model was offered which included elements of the Flex Model, the Virtual Model and the Supplemental Model. It was proved that the "Inverted class' technology for part-time adjuncts teaching based on *the principles of consistency*, *visibility, practical implication, the continuity principle, the principle of support* was effective and purposeful and greatly contributed to efficient development of foreign language scientific communication skills in a military higher school such as: foreign language proficiency, thinking efficiency, communicative competences, self-management.

Thus, blended learning principles implementation within a military higher school digitalization contributes to enhancing the role of a humanitarian component, expanding adjuncts' linguistic horizons, their erudition, learning contemporary methods and technologies of scientific communication in a foreign language, forming readiness to participate in Russian and international research teams' work for solving scientific and educational problems.

The prospect of further research lies in the advanced search and justification of new blended learning principles aimed at full-time and part-time adjuncts' intellectual and creative abilities development, working out intensification mechanisms in the context of educational transformations in the XXI century society.

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ФОРМИРОВАНИЕ НАВЫКОВ ИНОЯЗЫЧНОЙ НАУЧНОЙ КОММУНИКАЦИИ АДЪЮНКТОВ-ЗАОЧНИКОВ НА ОСНОВЕ ПРИНЦИПОВ СМЕШАННОГО ОБУЧЕНИЯ

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Аннотация. В условиях цифровизации военного профессионального образования возникает актуальная проблема поиска баланса между ее возможностями и негативными последствиями при ограничении доступа военнослужащих к глобальному Интернету и использованию личных цифровых устройств. Одно из решений данной проблемы лежит в реализации принципов смешанного обучения – принципов последовательности, наглядности, практического применения, непрерывности, поддержки в контексте модифицированной модели обучения, сочетающей элементы Flex Model, Virtual Model и Supplemental Model. Данная модель реализуется в рамках внутренней

защищенной информационно-телекоммуникационной инфраструктуры и полностью адаптирована к специфическим условиям военного вуза. Цель исследования – доказать эффективность модели на основе принципов смешанного обучения, позволяющих успешно формировать структурные компоненты иноязычной научной коммуникации адъюнктов-заочников в условиях военного вуза, а именно: владение иностранным языком, эффективность мышления, коммуникативную грамотность, самоуправление. Для решения проблемы были использованы методы сравнительного анализа, синтеза, систематизации и обобщения теоретических положений, а также констатирующий и формирующий эксперименты, педагогическое наблюдение, тестирование, количественный и качественный анализ, методы математической и статистической обработки эмпирических данных (критерий χ2 Пирсона). Опытно-экспериментальной базой являлся ВУНЦ ВВС «ВВА имени профессора Н. Е. Жуковского и Ю. А. Гагарина» (г. Воронеж). В эксперименте приняли участие 24 адъюнкта-первокурсника заочной формы обучения (12 офицеров – ЭГ, 12 офицеров – КГ). Результат опытно-экспериментального исследования показал эффективность и целесообразность реализации принципов смешанного обучения в процессе формирования навыков иноязычной научной коммуникации адъюнктов-заочников при подготовке к кандидатскому экзамену по дисциплине «Иностранный язык». Дальнейшее исследование проблемы связано с поиском и научным обоснованием новых принципов смешанного обучения, направленных на развитие интеллектуально-творческих способностей адъюнктов как очной, так и заочной формы обучения, в разработке механизмов совершенствования исследуемого процесса в рамках образовательных трансформаций общества XXI века.

Ключевые слова: смешанное обучение, адъюнкты-заочники, иноязычная научная коммуникация, дисциплина «Иностранный язык», военный вуз.