

## The methodology of development of information and communication competence in teachers of the military education system applying the distance form of learning

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**Abstract.** The paper theoretically substantiates the methodology of development of information and communication competence (ICC) in teachers of the military education system applying the distance form of learning. Scientific approaches to the concepts of “methodology” have been analyzed and the author’s vision of “the methodology of development of ICC in the military education teachers” has been suggested. In particular, they determine the methodological approaches to the methodology of its development, as well as its main stages, purpose, tasks, content, methods, types of training sessions, tools and organizational forms of learning.

**Keywords:** a teacher of the military education system, development, the methodology of development, distance learning, stages, tools of distance learning, information and communication competence.

### 1 Research problem

Currently, all aspects of the social production, including the system of domestic vocational education are significantly influenced by factors of the information society, especially information and communication technologies (ICT), which create rather favorable conditions for providing citizens with a wide range of educational services. One may positively ascertain that they have substantially improved the modern education system at all levels, as well as the military education system itself, which provides vocational training for specialists of the Armed Forces of Ukraine.

In the information society, network educational data centers and modern ICTs can contribute to significant improvement of the military and professional training of specialists, including teachers. Firstly, the ability of teachers to use them comprehensively in accordance with the educational and military-professional needs of cadets (trainees) is of particular importance. In this regard, it should be emphasized that their information and communication training must meet the requirements of the

information society, on the one hand, and of the military sphere, which widely uses the most up-to-date information technologies, on the other.

Secondly, the development and improvement of ICC by cadets (trainees) at higher military educational establishments (HMES) should be dynamic and sustainable as information technologies are updated and improved systematically and rapidly, especially in the military field. In this regard, teachers need to constantly improve their professional and pedagogical competence in line with the changes taking place in the information society and in the Armed Forces of Ukraine [11].

Thus, having analyzed the pedagogical practice in the military education system and having generalized and systematized scientific sources for the research of ICC in teachers, clarified its structure and content, we became convinced of the need to create a methodology for its development in teachers of the military education system applying the distance form of learning.

## 2 Analysis of recent research papers and publications

The analysis of scientific sources and thesis papers devoted to ICC of different specialists shows that the scientific researchers are conducted in the following problematic areas: interpretation of ICC (Anusca Ferarri [5], Mercè Gisbert [6], Isabel Gutiérrez Porlán [7], Rune J. Krumsvik [10], Virginia Larraz Rada [12], Yevhenii O. Modlo [14], Mykhailo V. Moiseienko [15]) and its formation (Yevhenii O. Modlo [13], Dirk Schneckenberg [16]) and development (Svitlana M. Amelina [1], Albert A. Azaryan [17], Olga V. Bondarenko [9], F. Xavier Carrera Farrán [4], Rostyslav O. Tarasenko, Olga G. Yaroshenko [22]).

However, the problem of creating a methodology for the development of ICC in teachers of the military education system remains unaddressed.

**The purpose of the present article** is to substantiate the author's methodology for the development of ICC in teachers of the military education system applying the distance form of learning.

## 3 Results of the study

Nowadays, in the conditions of development of the modern military education system in Ukraine, results of pedagogical science research, which should substantiate the educational process in HMES in the information society, develop innovative technologies and methods of professional training of military specialists, including with application of ICT, are of particular importance. One of the topical and promising areas of pedagogical research in both theoretical and practical aspects is the development of a comprehensive author's methodology for the development of ICC teachers of the military education system applying the distance form of learning, which should keep up with the requirements of today, and take into account all modern trends in military science and practice development, including the informational area.

In particular, the Decree of the Ministry of Defense of Ukraine dated December 21, 2015 No. 744 "On Approval of the Concept of Distance Learning in the Armed Forces

of Ukraine” identifies the main directions of development of one of the main organizational forms of training in the Armed Forces of Ukraine – the distance form of learning, which emphasizes the importance and relevance of our scientific task of creating methods of ICC development in teachers applying the distance form of learning.

Thus, the Great Interpretive Dictionary of the Ukrainian Language defines the concept of “methodology” as “the doctrine of teaching methods of a certain science, subject” [1, p. 664], and according to Vasyl V. Yahupov, the methodology is “specific forms and means of using methods, through which the deeper knowledge of various pedagogical problems and their solution is realized” [21, p. 357].

We adhere to the opinion of Semen U. Honcharenko, who interprets the notion of “learning subject methodology” as “a branch of pedagogical science that examines the patterns of learning of a particular subject. The content of the methodology as a partial didactics includes: establishing the cognitive and educational value of a given subject and its place in the educational system; defining the tasks of learning the subject and its content; elaboration, according to the tasks and content of training, of methods, methodical tools and organizational forms of training” [8, p. 206].

Therefore, the methodology in pedagogy is a purposefully substantiated methodical system of teaching and learning methods, types of lessons, methodical tools and techniques, tools of training and education, forms of organization of learning and educational activities, aimed at solving specific pedagogical tasks of educational, developmental or other nature, perfection of certain personal, subjective, mental, professional and other qualities, formations and manifestations of students.

Taking into account results of the analysis on interpretations of the concept of “methodology” in pedagogy, we can conclude that the methodology of ICC development in teachers of the military education system is a set of purpose, hierarchy of goals and objectives, content, forms of learning organization, teaching methods, types of lessons and teaching tools, which are applied and implemented methodically, systematically and consistently at the main stages of its development. It should be based on leading methodological approaches – systematic, competent, informational, subject-activity and contextual [11, pp. 10-16].

It relies on modern methodological approaches, which are conceptual grounds for defining the purpose, objectives, principles, content, teaching methods, types of lessons, tools and organizational forms of learning for the development of their competence, i.e. the main components of the methodology, which are creatively applied in the three stages of development of the ICC in teachers of the military education system.

**The purpose of the methodology** is to develop ICC in teachers of the military education system, which is achieved by realizing the main and partial goals of its development.

In accordance with the stated purpose, **the main tasks for ICC development in teachers** are determined in accordance with the leading provisions of modern methodological approaches, in particular:

- development of the value-motivational component (values of pedagogical activity using ICT; motivation for ICC development);
- development of the intellectual component (the knowledge of: ICT theory; theoretical foundations of analysis and decision-making in the military sphere; technology of processes (phenomena) modeling in the teaching of general and military-specialized subjects; theoretical provisions of the cyber security in the use of ICC in their teaching; modern software and hardware; software development technologies according to the methodology of teaching specific discipline);
- development of the praxeological component (these are the following abilities: to use ICT effectively in pedagogical activity; to systematically develop and apply modern hardware and software in the process of teaching general and military-specialized disciplines and to identify their cyber vulnerability);
- development of the informational and technological component (these are the following abilities: to use ICT systematically and contextually in pedagogical activity; to synthesize various software tools for improving the effectiveness of teaching of specific educational disciplines; to develop information software tools for their teaching);
- development of the subject component (pedagogical subjectivity of a teacher in the information society; the ability to objectively self-evaluate as the subject of pedagogical activity within the framework of official functions of the teacher of specific general and military-specialized disciplines).

For their development, it is advisable to adhere to the pedagogical principles of training at a higher military school [19, p. 230] taking into account creatively the principles of distance learning. In particular, the following principles of study at a higher military school shall be applied:

- scientific training implies that all facts, knowledge, provisions and laws that are taught must be scientifically sound and in line with the modern developments of science and technology in general and the military sphere, in particular;
- systematic and sequential training means the systematic and consistent presentation of educational material and systematic work of cadets (trainees) with it; depending on the content and the specific discipline, the specific goals, the teacher shall use a certain system of lessons, guiding cadets (trainees) from simple reproduction to independent creative activities with the studied material, including the direct modeling of specific military and professional situations using ICT;
- accessibility of training implies adherence to the following rules: from simple – to complex, from known – to unknown, from close – to distant, as well as taking into account the level of development of teachers, cadets (trainees), their individual characteristics; it requires the determination of time and labor costs, the level of mental and physical strain of students;
- the link between training and modern military practice is based on the objective links between science and military field, modern military theory and practice;
- awareness and activity in learning – it defines the subjective role and position of both the teachers and cadets (trainees) in the educational process; it requires awareness and self-stimulation of their pedagogical and educational activity and purposeful

management of it; formation of a positive attitude in cadets (trainees) towards a military specialty, an interest in educational material, close connection of training with military practice and its use in field, challenges of training, differentiated approach, use of modern information technologies and tools;

- visibility in training promotes conscious and holistic visual perception of educational information by teachers, cadets (trainees), its comprehension and assimilation, educates observation, attentiveness and develops practical thinking;
- sound knowledge and formation of practical skills and abilities – involves the repetition of the learning material by students by sections and structural parts, its memorization in combination with the learned, highlighting the repetition of main ideas, the use of various methods, organizational forms of learning and types of lessons;
- individualization of training allows each cadet (trainee) to master creatively and at an individual pace the educational material in the conditions of joint educational activity, taking into account the level of their own intellectual and military-professional development, individual cognitive and practical needs, interests, motivation activity, will and capacity;
- emotional component of the learning – involves the influence of the teacher on formation in cadets (trainees) of emotional and volitional sphere as a military professional, which directly activates their educational and cognitive activity, and prevents the emergence of negative impacts, by the way of logical, lively teaching of interesting examples, using various visual aids etc.

At the same time, it is necessary to creatively adhere to the pedagogical requirements and rules of **specific principles of distance education** (Valerii Yu. Bykov) [2]. These include:

- interactivity (involves the teacher's dialogue with a student);
- adaptability (provides the individual pace of the educational activity of cadets (trainees), provides for their own choice of the course, time for its study, term of consultations and examinations and tests, periodicity and intensity of their educational activity);
- humanity (consists in directing the educational process to an individual, creating the most favorable and comfortable conditions of study; mastering the military profession through the manifestation of creative individuality, civic, moral and intellectual qualities and their purposeful creative systematic development, which would provide cadets (trainees) with secure and comfortable conditions for professional education);
- priority of the pedagogical approach (the modeling of educational process provides for purposeful designing of distance learning taking into account the contingent of students, substantiation of specific concepts of formation, development and improvement of certain phenomena, creation of didactic models of those phenomena);
- pedagogical feasibility of application of modern information technologies (requires pedagogical evaluation of the effectiveness of each stage of the distance learning);

not only the ICT implementation, but the corresponding content of training courses and educational services should be brought to front);

- the choice of the educational content (the content of education must meet, on the one hand, the regulatory requirements of the State Educational Standard and the labor market, and on the other hand – the specific requirements of a student, and in our case, teachers and cadets (trainees) of the military education system);
- ensuring the protection of information circulating in the technological system of distance learning (involves the introduction of organizational and technical means of safe and confidential storage, transmission and use of various data and information in the educational process);
- adherence to the reference level of education (requires a certain amount of knowledge, skills, competences in both teachers and cadets (trainees));
- correspondence of information technologies to the goals, content and methods of training (adequacy of information training technologies to models of distance learning in the military education system);
- flexibility and mobility (creation of information networks, databases and banks of knowledge and data for distance learning in the military education system, which allows adjusting, supplementing and improving the educational program; preservation of information invariant education);
- correspondence of distance learning to the existing organizational forms of education (projected distance learning would give the required social, economic and educational effect, provided that the created and implemented information technologies do not become a foreign element in the traditional education system, but will be naturally integrated into it);
- cost effectiveness (involves rational use of financial and material resources, financial and technological calculation of the effectiveness of advanced training in the military education system by distance learning).

**Learning methods and types of training** used in the methodology. The distance education, like the full-time one, uses both traditional and active teaching methods [20]. For example, the following traditional teaching methods are:

- oral teaching of the educational material, which is divided into verbal-informative, verbal-heuristic, verbal-problematic, and verbal-research. It includes different types of stories, explanations, narrations, lectures;
- discussion of the studied material is divided into verbal-informational, verbal-heuristic, verbal-problematic, and verbal-research. It includes different types of conversations, seminars, discussions, brainstorming, intellectual briefings, situation analysis etc.;
- demonstration is divided into visual-informative, visual-practical, visual-heuristic, visual-problematic and visual-research. It includes presentation, illustrations, observations in the form of personal display to subordinates of some techniques and actions, demonstration of actions of individual soldiers, troops and units, display of natural and imaginative means of visualization, demonstration of films, etc.;
- practical methods are divided into practical-reproductive, practical-heuristic and practical-research (problematic). These include practical classes, group exercises,

laboratory work, lessons, maintenance of military equipment and weapons, command and control training, firing, driving military vehicles and more. For example, the main types of training at HMES that train officers for communication units and troops are tactical training and drill instruction, partial and comprehensive training, tactical and special training, command and staff training, training of troops. Accordingly, the methods of ICC development in teachers must be tailored to the special and general military disciplines;

- self-work is divided into all types of training applied in the above methods – verbal, visual, practical-information. It includes: work with printed sources; independent study of machinery; self-training; independent viewing of films, TV shows; work with information sources and the Internet, etc.;
- the methods of control and self-control in training include: individual control interview; questioning; written; testing; quests; machine control; self-control; exam; credit and more.

The combination of different teaching methods and types of training in the process of development of ICC in teachers of the military education system facilitates the development of subject actions, the development of actions inherent in their pedagogical activity through the means of ICT. The development of their ICC is not possible without the pedagogically balanced use of various types of training. It is also advisable to use all traditional types of training in their distance learning process. A compulsory methodological requirement is their adaptation to the ICT system and its application, taking into account the educational needs and capabilities of military education teachers.

**Tools.** In the technique it is advisable to use all the means used in the educational process, including ICT: computer-based educational systems in the conventional and multimedia versions; laboratory remote workshops; simulators; electronic libraries with remote access; didactic materials based on expert systems of educational purpose; didactic materials based on geo-information systems, etc.

The material basis is also profoundly changing in the development of teachers' ICC. It is an important component of the material support of the educational process in the conditions of distance learning, which is inextricably linked with the content and methodological systems of training of different educational disciplines in distance training courses for teachers of the military education system.

**Forms of training organization** are forms of organization and realization of the educational process at distance upgrade training courses for teachers, participants of which carry out educational interaction principally and mainly remotely (at a distance that does not involve direct educational interaction of participants when the participants are beyond the territory of possible direct educational interaction and when their personal presence in certain educational premises of the educational establishment is not obligatory in the course of training) [3].

The process of interaction of distance learning participants is usually synchronous (remote contact with the teacher, in real time) and asynchronous (contactless mode of interaction with the teacher).

Thus, the pedagogical practice of professional development by distance learning for teachers may creatively adapt and use the following well-known types of teaching: lectures; seminars; laboratory work; tests; credits; exams; consultations; self-work, etc. However, they must be adapted to distance learning in both the contact and contactless phases. It is most appropriate to use active learning methods that can be implemented through the use of computer networks, audio-video and another telecommunication tools, including directly and necessarily the Internet (see Table 1).

**Table 1.** Teaching methods and types of lessons for the development of ICC in teachers applying the distance form of learning.

Stage	Goal	Tasks	Method, technique, way	Type of a lesson
<b>The value-motivational stage</b>	to develop and enrich the values and motivation of ICC development	development of the value-motivational component of ICC	questioning, testing, stimulation, conversation, discussion etc.	all kinds of training in the high military school
<b>The development stage</b>	to develop theoretical and practical knowledge of the use of ICT in pedagogical activity, practical skills and ability to apply them in their activities	development of intellectual, praxeological, information-technological, subjective components of ICC	independent work with educational materials, educational conversation, educational discussion, method of exercises, method of oral control, self-control, method of written (test) knowledge control	all kinds of training in the high military school
<b>The final stage</b>	to implement successfully the previous stages of the methodology of ICC development; to perform the pedagogical evaluation of the ICC development levels of teachers	completing the ICC development in teachers of the military education system; determining the levels of ICC development in teachers	method of written (test) control of knowledge, practical skills, capacities and abilities of applying ICT in the pedagogical activity	practical and control lessons

Accordingly, the use of ICT tools in the process of development of ICC in teachers within the distance learning framework affects all the system components of its methodology, which allows setting and solving much more complex and applied pedagogical problems and situations in the process of its development, improving their creative intellectual and practical potential, critical and at the same time pedagogical thinking, independence in acquiring knowledge, working with various sources of educational information.

In the framework of our research, all the above elements of the ICC development methodology are prioritized in value-motivational, developmental and final stages, each having specific tasks and providing for specific educational results in accordance with the purpose of research and hierarchy of formulated goals for professional



development of teachers in the distance form of learning. It is advisable to implement through the distance learning course for teachers “Information and Communication Technologies in the Scientific and Pedagogical Activity of Teachers” (108 hours, term – 2 weeks).

**The value-motivational stage** is aimed at the development and enrichment, first, of the ICC development values by solving the following tasks: development of a positive attitude of teachers to ICT and their systematic application in the pedagogical activity; enrichment of axiological sphere of their consciousness and awareness of ICT, their nature among the categorical concepts of the universe, transformation of their essential characteristics in the conditions of the information society development: value orientations regarding their pedagogical existence in the information society as a subject of professional activity; promotion of awareness of the value aspects of ICT and identification of the practical application thereof in the pedagogical activity.

Second, by improving the motivation for the ICT development through solving the following tasks: development of a motivational attitude of teachers to pedagogical activity, which includes mastering the guidelines for the systematic use of ICT in the pedagogical activity; development of their desire to enrich their own information and communication potential as a subject of the pedagogical activity.

Accordingly, teachers should be aware of the value-motivational aspect of the ICT use in the pedagogical activity, be clear about where they can and shall apply them purposefully and systematically, and understand the benefits of their ICC developing for as a teacher in the information society and the military education.

**The developmental stage** is aimed at fostering theoretical and practical knowledge about the ICT use in the pedagogical process, practical skills and abilities for their creative application in the pedagogical activity. In particular, the focus is on development of the ability to search and analyze information, its synthesis and comparison, abstraction, generalization and concretization through ICT, taking into account the specifics of teaching military and specialty disciplines. Particular attention should be paid to development of flexibility and criticality of practical military and professional thinking, development of a set of abilities to work with hardware and software and its systematic and creative use in the pedagogical activity; the proactive nature of practical application of ICT to design and model quasi-professional situations in military activity.

**The final stage** supposes that the successful implementation of the previous stages of the ICC methodology would promote the development of all its components; teachers are able and willing to use ICT in the pedagogical activity. Accordingly, to confirm this hypothesis, it is necessary to diagnose its development, which will allow evaluating the effectiveness of the proposed method.

#### **4 Conclusions and prospects of future research**

Therefore, the ICC development in teachers of the military education system is a pressing scientific and pedagogical problem, which involves the use of appropriate specialized methods for development. The created methodology for the ICC development for teachers of the military education system in distance learning can be successfully implemented upon implementation of the specialized course “Information

and Communication Technologies in Scientific and Pedagogical Activity”. Accordingly, a consistent study of the topics of the distance course using ICT is a necessary pedagogical condition for the effectiveness of the implemented methodology for the ICC development in teachers of the military education system.

Prospective directions for further research: experimental testing of the ICT development methodology for military education teachers in retraining and advanced training courses in the distance form of learning.

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