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# Pedagogical Conditions for Ensuring the Formation of Information and Communication Competences of Higher Education Applicants

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## ABSTRACT
The article analyzes the state of the problem of formation of information and communication competencies of students in modern pedagogical science, reveals the essence and structure of information and communication competencies of students, defines criteria and levels of their formation, describes the features of pedagogical support of information and communication competencies of students.

**Keywords:** stimulus, motivation, learning motivation, adaptation, students.

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## INTRODUCTION
The development of the information society actualizes the problem of formation of information and communication competence in future specialists. Education, information and communication are the basis for the development, initiative and well-being of the human person. Along with this, information and communication technologies have a huge impact on almost all aspects of our lives. The progress of these technologies opens up completely new prospects for achieving higher levels of development of the digital society.

A future specialist who is to live in an information society should not only master the necessary information and programming techniques, but also, first of all, he needs to learn how to rationally use information and technologies to maintain and develop his intellectual and creative potential, effectively apply the acquired knowledge for making management decisions taking into account the economic, environmental, moral and aesthetic aspects of the innovative development of society. Of decisive importance is not only the volume and quality of knowledge, but also the level of students' competence, which determines their effective future professional activity.

Thus, information and communication competencies (ICC) are one of the leading key competencies and can be distinguished into a separate group as a set of competencies that require targeted formation in the process of mastering various disciplines by students.

## MAIN TEXT
Information and communication competence is defined: "as a set of knowledge, skills and abilities formed in the process of teaching and self-study of computer science and information technology, as well as the ability to perform professional activities using information technology" [1, 10, 21-24]; "This is the ability to work with information (collection, search, transmission, analysis); modeling and designing your own professional activity; modeling and designing the work of the team, the ability to navigate in the organizational environment on the basis of modern information and communication competencies, the use of modern means of information and communication competencies in their professional activities, ensuring an increase in labor productivity "[18, 26]. These definitions emphasize a very important, in our opinion, aspect of actualization of informational and communal competencies of students specifically for future professional activities. In general, ICC is understood as the ability to collect, assess, transfer, search, analyze information, model processes, objects by using the capabilities of communication and information technologies. Next, we will consider not the generalized concept of ICC, but the ICC of a future engineer, which is defined as the most important component of his professional competence, as an integrative characteristic of a specialist, reflecting the willingness and ability of a future engineer to effectively use information and communication technologies, in particular a database in professional activities, to improve his experience on their use and expand its content and boundaries [21].

When characterizing the concept under study, it is necessary to consider its structure. So, A.A. Abukadyrov includes motivational, cognitive and operational components in ICC, meaning by them, first of all, knowledge and skills necessary for the use of computer technologies, and motivation [21]. HELL. Arnautov

(2017) also defines information and communication competence as an integrative, dynamic personal quality that determines his ability and willingness to consciously use information technology in professional and social activities based on a functional combination of various ICC technologies and software that meet the requirements for the quality of engineering activities and informatization of society. The components include motivational-value, cognitive-activity, reflexive-evaluative, personal [27]. A more versatile component composition of ICC is defined by OS Zorin: motivational-value, content-activity, procedural, technological, evaluative-productive [13, 21-28]. Other researchers also suggest similar structures:

motivational, cognitive, activity-based, interactive.

need-motivational, operational-effective, evaluative-reflexive.

value-motivational, information-technological, communicative.

With a general difference in the opinions of scientists regarding the number of components and their qualitative composition, it seems important that scientists naturally identify cognitive and activity components [32, 33]. A number of scientists reasonably include a motivational-value or value-semantic component in the structure of competence [1-6]. Based on the foregoing, we consider the ICC of a future engineer as the most important characteristic of professional competence, including a combination of the following components:

- motivational and value;
- technological;
- cognitive.

So the motivational-value component can include such competencies as the ability to self-organization and self-education. Scholars reviewing the content of the ICC include:

- unity of information-theoretical methodological and technological knowledge that integrates general and special knowledge on the use of ICC in solving professional problems;

a set of skills and abilities to use computer technologies in professional activities (communication, design and construction, control and evaluation);

the interest of the future engineer in computer technologies in information activities in general, his motivation and the degree of motivational impulses to master these technologies and their use in solving professional problems, as well as the attitude towards the development of his ICC;

- knowledge of methods of receiving and transmitting information; active use of ICC in professional activities as a means of knowledge and development, self-improvement and creativity; the system of motives, emotional-volitional and value attitudes of the student to the world, to activities, to people, to himself, to their abilities, their development and determining the selective focus on information activities and interaction; the ability to consciously control the results of one's activities and the level of one's own achievements, the formation of such qualities and personality traits of a future engineer as creativity, initiative, focus on cooperation, co-creation, a tendency to self-analysis.

The presence of a motivational-value component in competence is determined by its activity nature and the fact that any activity at its beginning has goals, needs, motives, intentions, interests, desires. Taking into account the opinions of scientists, we note the need to include in this component reflexive-evaluative competencies that orient the subject of information activity to assess the achieved level of ICC formation in relation to the required one [11]. Therefore, to the first component, we attribute the orientation of the student's personality to the development of his ICC, the desire for self-organization and self-education in future professional activities.

The technological component includes:

- the ability to communicate in oral and written forms for solving problems of interpersonal and intercultural interaction.
- the ability to search, store, process and analyze information from various sources and databases, to present it in the required format using information, computer and network technologies;
- the ability to use knowledge of modern technologies for collecting, organizing, processing and recording information;

Also, in this component, reflecting, first of all, personal characteristics, scientists include competencies that allow them to interact:

- knowledge of netiquette;
- the basics of safe behavior on the Internet;
- performance with audio-video support;
- participation in the discussion (video, audio, text materials); □ sending letters, messages;
- □ mailing out to the target audience using e-mail, instant messengers, social networks;
- participation in the forum, discussion;
- interaction in social groups and networks, group work on the document.

The technological component can include labor actions and the necessary skills:

- use modern computer technology, work in the information and telecommunications network "Internet";
- work with digital and information sources;
- maintain databases in the software package;
- search, organize, analyze, process and store information from various sources and databases;
- present information in the required format using information, computer and network technologies;
- assess and analyze the quality of work performed, mathematical processing of measurement results.

Thus, the technological component includes, first of all, a set of skills and abilities of using ICC in professional activities. The cognitive component can include general professional competencies:

- the ability to use the knowledge of modern technologies.

And also, the necessary knowledge:

- actual problems and trends in the development of foreign experience and modern methods (technologies) of production.
- methods of technical design and creation of land management documentation.

Consequently, the cognitive component is a system of knowledge of modern engineering technologies. Thus, the ICC of a future specialist, in our opinion, is a set of components: motivational-value (orientation of the student's personality to the development of his ICC); technological (a set of skills and abilities of using information and communication technologies in professional activities); cognitive (knowledge system of modern technologies of professional activity).

All of the above determines the content of the professional training of a future specialist, who must have

not only a high level of professional competence, but also take an unconventional approach to solving difficult situations, organize his professional activities on a creative and independent basis. As an integral element of professional ICC, it stands out in the context of in-depth theoretical and methodological practical training, mainly for future specialists in the field of information technology [1, 4].

In general, the informatization of education is considered in many works. The fundamental work of foreign researchers A.A. Andreeva, S.A. Beshenkova, G.A. Bordovsky, Ya.A. Vagramenko, S.G. Grigorieva, S.A. Zhdanov, V.A. Izvozchikova, A.D. Ivannikova, S.D. Karakozova, A.A. Kuznetsova, V.V. Laptev, B.C. Ledneva, E.I. Mashbitsa, E.S. Polat, I.V. Robert, V.V. Rubtsova, A. Ya. Savelyeva and others.

So, in the works of modern researchers A.A. Kuznetsov, I.V. Robert, A.N. Tikhonov, and others note the need to use ICC tools in order to improve organizational forms and teaching methods that ensure the development of the student, the formation of skills for collecting, processing, transferring information about the objects, processes and other phenomena being studied.

In the research works of a number of authors S.M. Taneev, G. D. Glazer, S.G. Ivanov, T.V. Kapustina, S.S. Kravtsov, S.I. Makarov, I.V. Robert, JI.JI. Jacobson et al. Emphasize the need to use ICC facilities, in particular, remote training facilities.

Also, experts emphasize the possibility of more effective use of ICC in higher education (Yu.S. Branovsky, T.G. Vezirov, A.JI. Denisova, I.G. Zakharova, M.B. Lebedeva, N.V. Makarova, T. V. Pankov, T. L. Shaposhnikova and others).

Let's consider the main characteristics of this process. The process of transition to an electronic information space in the field of education involves not only mastering new technologies, but also acquiring skills and abilities to effectively use them in future professional activities. To achieve these goals, it is necessary to consider the methodological foundations of the process of forming the ICC of future specialists, to develop an effective form of organizing the educational process, which we are considering in the framework of project activities.

The methodological basis of the study is the following approaches: system-activity, personality-oriented, competence-based, regional.

For any system, the definition of its structure is characteristic. The structure, as it were, permeates all the elements of the system with a single thread, representing an integral characteristic of the system. Therefore, the identification of the structure is associated, on the one hand, with the establishment of a holistic, on the other hand, a differentiated nature of the object. In pedagogy, there are various approaches to the use of general systems theory to the analysis of pedagogical activity (A.N. Averyanov, I.V. Blauberg, R. Bertalanfi, V.I. Zagvyazinsky, V.V. Kraevsky, V.A. I. Uemov and others). In the process of designing the personality of a future specialist, researchers identify the principles of integrity and development that ensure the relationship of the whole and its parts, psychological and pedagogical theories and teaching practice. The main means of implementing these principles are intersubject and intrasubject communications. The modern vocational education system is also based on the principles of humanism, fundamentalism, universality and alternativeness, continuity and predictability, which determine its functioning. The activity approach, substantiated in domestic sciences by S.L. Rubinstein, L.N. Leontiev, A.V. Petrovsky and others, allows us to consider it through the word - "activity", as a specific form of socio-historical life of people, a purposeful transformation of natural and social reality by them. For our research, the postulate is especially important that it is in activity that personality development is carried out. The didactic principle of personality development provides for the unity of the activity and consciousness of the individual, which ensures the development of students' thinking (K.A. Abulkhanova-Slavskaya). Consequently, realizing the system-activity approach in the professional training of a future specialist, it is necessary to correlate his professional and personal development with the requirements of practical activity. Experience shows that it is advisable to design an educational environment that, based on the widespread use of ICC, would ensure the processes of education efficiency, increase its creative approach, create conditions that are most conducive to increasing ICC [14-20].

International practice in the field of vocational education defines special requirements for the depth of practice-oriented knowledge of the graduate, which contributes to the development of not only professional competencies and skills of students, but also ensures their personal growth [7-12]. It should be noted that the problem of the quality of education in a constantly changing world is well disclosed in the works of foreign scientists who consider the modernization of education through the development of project-oriented learning in educational institutions.

This approach allows for the integration of various educational areas and the idea of interdisciplinary communications based on the electronic information educational environment. The creation of an electronic information and educational environment and its role in the education system is due to modern changes in the economic and social life of society, the rapid development of information technologies, and changes in the labor market.

The electronic information and educational environment have always been the basis of any educational system, and today every higher educational institution faces a complex, multifaceted task associated with its further development. The problems of creating an information and educational environment have become the subject of a number of studies (M.I.Bashmakov, S.G. Grigoriev, S.E. Kovrova, K.G. Krechetnikov, AA Kuznetsov, CB Panyukova, E.S. Polat, I. V. Robert, O.I.Sokolova, A.P. Tryapitsyna, and others). In the works of Yu.S. Branovsky, S.G. Grigorieva, S.L. Lobachev, V.B. Moiseeva, M.I. Nezhurina, E.S. Polat, L.N. Ruliene, V.I. Soldatkina and others considered the organization and functioning of the information and educational environment.

The problem has not been studied in detail, but the basic terms and concepts of this subject area have been defined. Considered as - “a pedagogical system that combines information educational resources, computer teaching aids, educational process management tools, pedagogical techniques, methods and technologies aimed at the formation of an intellectually developed socially significant creative personality with the necessary level of professional knowledge, skills and skills "(S. A. Nazarov);

- "a systemically organized set of information, technical, educational and methodological support, inextricably linked with a person as a subject of the educational process" (VV Kalitina);
- "the pedagogical system plus its provision, i.e. subsystems financial and economic, material and technical, regulatory and legal and marketing, management "(A. A. Andreev).

In accordance with the considered definitions, the electronic information and educational environment is interpreted as an infrastructure of the educational process that serves, supports the formation of a personality in educational activities and includes information, technical and educational subsystems that orient its subjects towards obtaining high-quality educational results (Yu. Tatur).

The electronic information and educational environment should provide the following directions:

- access to all necessary curricula, work programs of disciplines (modules) and practices. Access to publications of electronic library systems, reference and biliographic devices and subscription electronic educational resources (Yurayt, Znanium.com, Consultant +, EBSKO, Liters, Lan, IPRbooks, etc.), specified in the work programs of disciplines and funds of assessment tools (servers, media library, data warehouse, stationary computers, multimedia equipment, peripheral devices, computer networks, network cloud technologies, university website, department website, cloud databases, Wi-Fi network, website);
- monitoring the study of the educational process, the results of intermediate and final certification, as well as the results of mastering the main educational program;
- conducting training sessions, procedures for outcomes and learning outcomes, which provide for the use of e-learning and distance learning technologies (classroom lessons: lectures, laboratory and practical exercises, seminars; extracurricular work, independent work, distance learning, full-time and part-time education);
- organization of network interaction between participants in the educational process (teacher - student - group, dean's office). Conducting consultations and methodological assistance via e-mail, forum, blog, social networks, webinars, cloud services.
- formation of an electronic portfolio of students. Saving students' works, reviews and assessments of the entire educational process (portfolio system).
- interaction between participants in the educational process, including through applications via the Internet;
- access to the texts of qualification papers (term papers, the "Antiplagiat" program and projects);
- distance learning system (Moodle).

We emphasize that the functioning of the electronic information and educational environment should be provided with appropriate means of information and communication technologies and the qualifications of workers who use and support it. Therefore, the meaningful and technological development of the institution presupposes:

- continuous modernization of software and hardware of the available computer equipment;
- regular professional development of teachers and specialists of the institution in the development and use of ICC in the educational process; improving the management of the educational process of the university as a whole.

## CONCLUSION

Formation in the electronic information and educational environment is an integrated environment of information and educational resources, software, hardware and telecommunication tools, rules for its support, administration and use, providing information support, organization and management of the educational process, scientific research and professional consulting with uniform technological means. All this together contributes to improving the quality of teaching and research and their intensification.

Thus, the formation of ICC combines information and educational resources, teaching tools and educational process management tools. The tasks include the formation of a qualitatively new level of ensuring the educational process based on interactivity and distance.

## REFERENCES


1 Verbitsky A.A. (2012). Active Learning in Higher Education: A Contextual Approach.
2 Zair-Bek E.S. (2010). Fundamentals of pedagogical design: a textbook for students, practicing teachers, St. Petersburg, p. 234.
3 Sergeev I.S. (2004). How to organize the project activities of students: A practical guide for employees of educational institutions, M., ARKTI, p.4.
4 Smolkin A.M. (1991). Active teaching methods. M.
5 Kuts, M. O. (2016). Problem technologies in foreign languages teaching of higher technical educational establishments students'. Cherkasy University Bulletin: Pedagogical Sciences, 37(370).
6 Skliarenko Olesia, Akimova Alina & Svyrydenko Oksana (2019) Psycholinguistic Peculiarities of Contextual Realisation of Concept «MACHT» in Linguistic and Cultural Space of German's. Psycholinguistics. Pereiaslav-Khmelnytskyi Hryhorii Skovoroda State Pedagogikal University. 26 (2). pp. 321-340.
7 Shytyk Liudmyla & Akimova Alina (2020) Ways of Transferring the Internal Speech of Characters: Psycholinguistic Projection. Psycholinguistics. Pereiaslav-Khmelnytskyi Hryhorii Skovoroda State Pedagogikal University. 27 (2). pp. 361-384.
8 BogoyavlenskayaA. E. (2004). Development of students' cognitive independence, monograph, Tver, pp. 160
9 Rybnova A. N. (2002). System of management of professionally oriented independent cognitive activity of students, Saratov. state social – economy, Saratov, pp. 200.
10 Zimnyaya I.A. (1997). Pedagogical psychology, R., Phoenix, pp. 480.
11 Kovaleva T.M. (2009). Innovation school: axioms and hypotheses, Pedagogical community of Russia, pp.170.
12 Bugrimenko A.G. (2006) Internal and external motivation among students of a pedagogical university. Psychology at the university, no. 3, pp. 15-28.
13 Kolominskiy Ya.L. (2007) The Psychology of Pedagogical Interaction, Speech, pp. 240.
14 Ovchinnikov M.V. The dynamics of motivation of teaching students of a pedagogical university and its formation. Author's abstract ... cand. psychol. Sciences: Ekaterinburg, 2008, pp. 26.

15 Iasechko S., Skomorovskyi V., Andronov I., Zaitsev O., Bortnik O. 2020. FEATURES OF THE SUBJECTIVE CIVIL RIGHTS ON PATENT. Journal Of Critical Reviews, 7 (13), 297-299. Doi:10.31838/Jcr.07.13.50
16. Iasechko S., Stepanenko T., Korolova V., Makovetska N., Chernetchenko O. (2020) FEATURES OF LEGAL REGULATION TRANSPLANTATIONS IN UKRAINE. Journal Of Critical Reviews, 7 (13), 430-432. Doi:10.31838/Jcr.07.13.76
17. Iasechko, S., Bratsuk, I., Petrechenko, S., Kazanchuk, I., & Liashenko, R. (2020). Development Of The Doctrine On Certain Personal Incorporeal Rights In European Countries. Journal Of Advanced Research In Law And Economics, 11(4), 1169-1174. Doi:10.14505//Jarle.V11.4(50).12
18 Markova A.K. Formation of motivation for learning. M., Education, 1990, pp. 191.
19 Leontiev A.N. Activity (2005). Consciousness. Personality. M., Smysl, pp. 352.
20 Iasechko M., M. Kolmykov, V. Larin, S.Bazilo, H. Lyashenko, P. Kravchenko, N. Polianova and I. Sharapa. (2020). Criteria for performing breakthroughs in the holes of radio electronic means under the influence of electromagnetic radiation, ARPN Journal of Engineering and Applied Sciences, 15(12), pp. 1380 - 1384.
21 Iasechko M., N. Sachaniuk-Kavets'ka, V.Kostrytsia, V.Nikitchenko and S. Iasechko (2020). The results of simulation of the process of occurrence of damages to the semiconductor elements under the influence of multi-frequency signals of short duration, Journal of Critical Reviews, 7(12), pp. 109 - 112. doi:10.31838/jcr.07.13.18.
22 Iasechko M., V. Larin, D. Maksiuta, S.Bazilo and I. Sharapa (2020). The method of determining the probability of affection of the semiconductor elements under the influence of the multifrequency space-time signals, Journal of Critical Reviews, 7(9), pp. 569 - 571. doi: 10.31838/jcr.07.09.113.
23 Piskunov S., M.Iasechko, N. Minko , Yu. Dolomakin, O. Palagin, M. Musorina (2020). Taking Into Account The Correlated Errors Of Measurements When Estimating Parameters Of Object Trajectory At Mechanical Movement, IJETER, 8(9), , pp. 5603 — 5606. doi: 10.30534/ijeter/2020/112892020.
24 Iasechko M., V. Larin, O. Ochkurenko, S. Salkutsan, L. Mikhailova, and O. Kozak (2019). Formalized Model Descriptions Of Modified Solid-State Plasma-Like Materials To Protect Radio-Electronic Means From The Effects Of Electromagnetic Radiation, IJATCSE. 8(3), pp. 393-398. doi: 10.30534/ijatcse/2019/09832019.
25 Abdukadyrov, A.A. The role of information and communication and computer technology in the competence of a future engineer. Young scientist, 2012, no. 6, pp. 363-366.
26 Zimnyaya, I.A. Key competences - a new paradigm of results modern education / Internet journal "Eidos", 2006. Access mode: http://www.eidos.ru/journal/2006/0505.htm
27 Zimnyaya, I.A. Key competencies as an effective target the basis of the competence-based approach in education. Author's version. Moscow: Research Center for Training Quality Problems specialists, 2004, pp. 42 p.
28 Zimnyaya, I.A. Competence approach. What is its place in the system approaches to educational problems? Today, 2006, no. 8, pp. 20-26.