Social and communicative engineering as the newest type of engineering

N. Kunanets[1], V. Pasichnyk[1], A. Fedonyuk[2]

[1] **Lviv Polytechnic National University; e-mail: nek.lviv@gmail.com**
[2] **Lesya Ukrainka Eastern European National University**

Abstract. The authors describe a scientific substantiation of the concept "social and communicative engineering", outline the object and the purpose of study of a new type of engineering, which is being actively formed and is objectively demanded in today's information society. Social and communicative engineering forms rules of the correct construction of social groups, of the setting of internal relations in them and regulations of the building of relationships with the outside world. The methods of social and communicative engineering are specific techniques used for the designing and the construction of social and communicative technologies and systems, and also scientific, where the leading one is the system analysis. Social and communicative engineering, in the authors' interpretation, is a set of methods, tools and means which, when is used systematically, allows to design and create the qualitative and effective social and communicative technologies and systems. In other words, social and communicative engineering is the science that investigates the processes of construction, projecting and creation of social and communicative technologies and systems. Social and communicative engineering, as the science that studies the processes of designing and creating of social and communicative systems, is in demand, particularly during the formation of the system of relations between members of different parties and political platforms, ideological beliefs of various communities through the establishing of communications, particularly with the engagement of possibilities of the information spreading through social networks.

Key words: social communication, social institution, social engineering, social and communicative engineering.

INTRODUCTION

The multifaceted and the most essential activity of social institutions, as important constituents of a system of social communication, determine the necessity of the use of different methodological approaches to their research. The analysis of social and communicative processes in the society is complicated by the necessity to study their impact on the functioning of social institutions, their interaction with the environment, the need to consider the social and communicative processes, taking into account the following levels: of individuals, of the individual and social institution, of two social institutions, of social institution and society or social and communicative system of a higher rank.

Nowadays, scientists are seeking to explore and analyze social and communicative processes and fix into them certain patterns, to make a systematic review of the methods, ways and means of the distribution of information flows in social and communicative systems, and to examine thoroughly the processes of the functioning of social networks.

The purpose of the article is to analyze systematically and to present scientific substantiation of the concept and definition of the term "social and communicative engineering", to describe an object, a subject and methods of investigation of a new type of engineering, which is being actively formed and is objectively demanded in today's information society.

THE ANALYSIS OF RECENT RESEARCHES AND PUBLICFTIONS

A lot of scientists, both foreign and Ukrainian, repeatedly addressed the profound research of methodological foundations of social communications, among which in the first place it should be named N. Vinner [1], V. Rizun [2] and others. However, the scientific substantiation and the definition of the concept of social and communicative engineering, in the proposed sense by the authors of this article, as a separate type of engineering that focuses on the study of social communication and its components, have not been used yet.

OBJECTIVES

The aim of this article is to analyse of the concept "social and communicative engineering" as one of the newest types of engineers, her subject and object of study, methods that she uses.

THE MAIN RESULTS OF THE RESERCH

The definition of the concept "social and communicative engineering."

The term "social communications" appeared in 1963 at the Second Vatican Council. At the second session of the Council the term "social communications" was first coined [3], although these concepts existed until 1963 and were defined by means of other concepts. In particular, the concept "communication" ("communicatio") was understood as a unity, a transfer, a message, and its meaning came from the word "communico" – making joint, inform, connect.

The first paragraph of the "Decree on social communication" adopted by Pope Paul VI, says that among the technological discoveries that talented people, especially in the current era, have made with God's help, the Church welcomes and promotes with special interest those, which are directly related to the human mind and which opened new opportunities for communication, extremely quick acquaintance with news, views and teachings of every kind. The most important of these inventions are media, such as newspapers, cinema, radio, television and others, which may, by their very nature, comprise and influence not only the separate individuals, but also the masses of people and all human society, and thus can be rightfully called the media of social communication [3].

In the third article of the first section it was stated that the church considered as one of its duties to announce the good news of salvation also with the help of the media of social communication and to inform people about their proper use [3]. The decree emphasizes the importance of freedom of dissemination of information in the modern world. Thus, it can be reasonably stated that the church was one of the active factors in the development of social communications.

A wide range of information and social and communicative technologies is used to implement social communications. Social communications is an interesting object of scientific study, research and analysis. The presence of technologies that implement these processes determines the need for the formation of such a scientific field which analyzes, learns and explores them. The authors of the article propose to give it the generalized name – social and communicative engineering. Social and communicative engineering, in the authors' interpretation, is a set of methods, tools and means which, when is used systematically, allows to design and create the qualitative and effective social and communicative technologies and systems. In other words, social and communicative engineering is the science that investigates the processes of construction, projecting and creation of social and communicative technologies and systems. A new kind of engineering must inevitably be originated in modern conditions which from historical interpretation of the Greek term "engineering" means science that studies and investigates the processes of projecting, creation and construction. The basis of engineering activity consists of five phases: the definition of the goal, the analysis of materials, needed to achieve the objectives, the analysis of means of achieving this goal, the modeling and prototyping, the management of the processes of achieving the aim [4].

Thus, an appropriate type of engineering must be arisen in the medium of social communication, which methods and tools allow properly and correctly to design and create social and communicative systems. A professional look at conceptual foundation of the information society, the interpretation of which is given in the documents of the World Summit on the Information Society, and which recorded the basic profile of its informatization, and, unfortunately, could not define by what means, methods and ways such society should be built and how, after all, correctly to "design" and to "form" it. It should be noted that in these documents, according to the authors, the natural assertion is that the social and communicative engineering is the science, which should work out such methods and means of proper construction of the modern information society, and further knowledge of the society. Social and communicative engineering is emerging as one of the newest types of engineering and certainly should have its subject and object of the investigation. According to the authors, the object of social and communicative engine-ering is social communications and their components, the subject – is methods, tools and means of designing and the construction of social and communicative technologies and systems. The methods of social and communicative engineering are specific techniques used for the designing and the construction of social and communicative technologies and systems, and also scientific, where the leading one is the system analysis.

Subject of study of social and communicative engineering.

Social communication has already become the subject of study of a large number of branches of science. Analyzing the processes of formation of social communications L. Amlinskiy pointed out that the centre of social life in pre-industrial societies was the market square; in industrial society the information area was considerably expanded: the printed sources of information appeared – newspapers, magazines" [5]. It is obvious, that the means of oral communication did not provide the qualitative transmission of information, the factor of preserving authentic information wasn't taking into consideration, certain communication barriers existed such as separation of sources and receivers in space. With the appearance of writing the opportunity of more fully qualitative satisfaction of informational needs emerged. The appearance and active functioning of handwritten items, that played a significant role in the development and improvement of the processes of information spreading, should be mentioned while complementing L. Amlinskiy's statement.

Decisive for the semantic definition of the field of "social communications" are the principles and analytical tools, formed on the basis of information cybernetic paradigm of Norbert Wiener [1], William Ashby [6] and others. Many researchers and leading scientists from all around the world constantly improved the theoretical foundations of the defined scientific branch.

M. McLuhan, considering the book as means of communication, emphasized, that the invention of printing books gradually accelerated the act of reading to such an extent that the reader could feel the "hand" of the author, strengthened and expanded visuality of applied knowledge. The researcher made an interesting conclusion that in the era of handwritten sources, the transmitting of information, by means of copying and distribution of someone else's book was considered to be an act that deserved full respect, whereas in the era of printing books this way of information spreading was judicially prosecuted [7].

The means of communication [8], in his opinion, is a message, that defines, controls the scope, the form of human association and the human action. The change of scale or form of human activity is considered as a peculiar "message" in the system of social communications. M. McLuhan noted, that the mean of communication by itself is a message, and all means of communications is a kind of "translators" from the one type of experience and energy to another [7]. Analyzing the views of his contemporaries as to the development of social communications, the researcher demonstrates the original vision of this process.

However, the scientist emphasizes, that despite the widespread association of the term communication with roads and bridges, sea routes, rivers and canals, in the "electric" epoch, it received somewhat broader meaning – "the movement of information", including through the notification in the press and printing items. The innovative approach to the study of communication, according to the researcher, lies not only in the content analysis, but in the analysis of the means of communication and the environment (cultural matrix), in which this or that means is functioning, and every means of social communication has the ability to impose its understanding of the problem [8].

The scientist believes, that the appearance of book-printing accelerated the development of social communications, allowed to form a social memory, on the background of which previously existed individual memory has lost its relevance. The new technology quickly entered the social environment, arts and sciences. The printed book acquired qualities of portability and accessibility, which manuscripts lacked [8] that certainly made it an effective tool of social and communicative processes.

Harold Innis suggested the idea that the development of means of communication automatically affects a person. It interacts with cultures in such a way that the determination of national identity is impossible until the national language finds a printed form. The researcher regards to the means of communication, in particular letter, papyrus, radio, photoengraving, as products of manufacturing and resources that take an active part in social and communicative processes [9].

The appearance at the beginning of XX century of the new means of communication – radio, provided an opportunity to transmit information to geographically remote consumers, involving at the same time quite a wide listening audience. Television enhanced further more the possibilities of spatial transmission of information, ensuring its visualization and efficient supply of information from the places of events.

The representative of the communicative philosophy J. Habermas stated that "Communication is recognized by recent foundation and of consciousness, and of knowledge, and of social being", herewith communication is considered not only as a means of sharing information, but also as a socio-cultural phenomenon – an important aspect of human development, that directly correlates with the general nature of culture and the change of historical epochs [10].

Communicative philosophy considers that it is necessary to justify rationally the universal foundations of human mutual understanding and harmonization of relations between people, and also between the individual and the environment [11]. To some extent, its task is correlated with tasks of, but for the latter their limits are much broader. The communicative philosophy is close to the social and communicative engineering on the subject and the research method, since it is based on a study of everyday speech communication between people [12].

From the standpoint of the theory of communicative action J. Habermas believes, that the resulting internal context would prevent from achieving the argumentative consensus in the implementation of daily communicative processes and from finding answers to the "practical questions", from describing and assessing the causes of certain events [10].

The researcher pointed out that communication between people operates only when it organizes the processes oriented to the cause. This means that participants of the communicative process should give up the desire to achieve the perfection of this process until they communicate; herewith their communication process has to be justified and is open to criticism [10].

Thus, the representatives of the communicative philosophy consider social and communicative processes as daily processes of communication.

A. V. Sokolov [13] stated, that communicative issues became a part of fundamental social sciences – sociology, psychology, social psychology, cultural studies, social philosophy, and is also mastered by different applied sciences from the documentary and journalism to the theory of advertising and public relations, but a complete theory of social communication has not been formed yet. Each branch of science covers a particular area of social communication, but the whole structure of the communicative universe is not analyzed, although the notion of the social communication is interscientific and such sciences as hermeneutics, linguistics, logic, psychology, sociology, philosophy, and aesthetics take part in its development. A. V. Sokolov also analyses such category of social communication as a social memory. The scientist considers it to be the object of the history, and meanings of the past as its subject.

Social institutions were analyzed by researchers as a relatively stable form of social practice, due to the needs of society. Such studies have focused on their social role, public purposes, social functions, assuming that the definition of the output social functions of social

institutions gives an idea about the nature of their activities.

Social historically significant milestones in the development and improvement of social and communicative processes were so-called information revolutions, which, from the point of view of the prominent Ukrainian cybernetics, academician V. M. Glushkov [14], happened in the following order: first – the appearance of speech on the basis of sign communication; second – the emergence of writing; third – the appearance of printing; fourth – the invention and the use of the first computers. While continuing this scientifically innovative row, it should be noted that the formation of a global informational world infrastructure – the Internet network, certainly claims to be the fifth socially-oriented informational revolution. With a high degree of reliability and validity of scientific forecasting it can be assumed that the future (to some extent current) sixth informational revolution brings the maximum informational mobility and informational personalization for every member of the society based on modern informational and telecommunication technologies. In the nearest future, the implementation of the principles of mobile and personal possession of the actual informational resource on the principle "all the necessary information – here and now" is the main aim of social and communicative transformations. By achieving this global social and communicative goal, human civilization will practically complete the implementation of a particular cycle of the improvement of social and communicative technologies.

The above mentioned informational revolution can be considered as the revolution in the social and communicative industry. Social informational institutions, which ensure the accumulation, the storage and the distribution of social informational resources, played a significant role in each of them.

The author of the mathematical theory of communication K. Shannon [15] in his works drew parallels on how to exchange data between technical facilities and people, stating that the system of communication is a system comprising five components: a source of the information, which produces a message or a sequence of messages to be brought to the attention of the receiving terminal; a transmitter, that operates to create a signal suitable for transmission over the channel; a channel, which is only the medium, that is used for the signal transmission from the transmitter to the receiver; a receiver that usually performs the opposite operation to that done by the transmitter – reconstruction of the message; a person or a thing for which the message is intended to.

The actions of the communicant, which usually lead to social transformations, are determined by subjectivity, a characteristic of decoding. Moreover, in social and communicative systems it is quite difficult to estimate the level of informational "noise" in the "messages" provided by a system.

According to authoritative experts, such as A. I. Mikhailov, A. I. Chornyi, R. S. Hiliarevskyi, in computer science the channel of communication is established between the communicant and the recipient, which is

essential for the connection (the exchange, the transfer of information). Meetings, conferences, radio and television, publishing houses, editorial offices, libraries – are channels, which provide direct or indirect scientific communication [2]. Thereby they consider informational social institutions to be active participants of the exchange of scientific information, structures for the generating, the processing and the distribution of scientific knowledge.

Professor W. Rizun [2] states that social institution necessarily creates a predefined "system of social interaction", applying "the defined ways, methods, tools, principles of establishing and maintaining of the contacts through the professional and technical activity" with certain organized community, that are disposed "as full participants of social interaction".

Dominant trends of growth of the theory of social communication at this stage are concentrated on the focus of the research of communication environment, that enables to generalize organizational, methodological, technological, functional, content, managerial (including design) aspects of social communications in partial and applied studies of sciences in the system of communicative knowledge [2].

The research of many social institutions is based on the statements by Professor V. Rizun, that a methodological approach to the study of phenomena, processes, functions of social communication is obviously the social and communicative approach [2]. According to the researcher, the essence of this new approach is fixing, monitoring, description, analysis and interpretation of the given in the system concepts of social and communicative engineering. More specific this approach is focused on the impact on the society which is made by the object of the research, that was technologically laid, and how the society responded to the object of this influence [16]. The formation of the defined new scientific field by us, which is the social and communicative engineering, covers much broader aspects of the forming of social and communicative technologies and systems.

The researcher believes that the approach to social communication as engineering study for understanding the organization of social and communicative affairs, staff training, and also the carrying out of the research in this area, is of fundamental importance [2].

According to V. V. Rizun, the social communication is formed under the laws of communication, that's why any technological things anticipate the use of scientific knowledge about communication and organization of social and communicative affairs, without which there is no effective development of social engineering. The researcher projected technologies only on social engineering, believed that for the "social engineer" social and communicative network is a "vascular system" for the ensuring of the social connection and social impact on the society. However, the scientist didn't fully decide on the terminology using the term social engineering and as the synonym the social and communicative engineering affair. He considered firstly being the science of social communications, and not the science of interaction (communication). In his opinion, the social engineering is the science of "the history (origin and development) of

the study of social communication, the importance of that type of social engineering affair, which is now called social and communicative", of "social communications as the product of the social and communicative affair" [2].

This approach is supported by O. M. Kholod, who suggested to analyze engineering from the standpoint of social communication, considering it to be the social and communicative engineering, namely a process of "creating, forecasting, adaptation and implementation of communication technologies, strategies and models of social action, interaction and relationships between social persons (subjects and objects) for the purpose of manipulating (positive or negative impact)" [17].

The role of various social institutions in the information society, their social functions, focusing on the many institutional aspects, including interaction with the environment, requires clearer delineation. Other activities of social institution have not been an object of the study over the years. As J. Shira [18] stated, the social institution is "a set of social events, conventions and formal structures by which society fixes limits, controls and establishes the forms of the activity of all its members", herewith the researcher stresses that in this interpretation a library (with the readers) is the one of the "structures" of the system of social and communicative society. He regarded society as a social institution, which incorporates special institutions (services, organizations) and professional personnel, distributed among regions (subsystems) of the institution: practice, science, education, management, industry press. J. H. Shira considered library as one of the departments of the institution of education. As if continuing his view A. V. Sokolov [19] convincingly used the interpretation of the category "social institution" for analyzing social and communicative systems. Considering the social institution as a real social system consisting of interconnected and interdependent functionally specialized elements, the researcher constructed its structural and functional model, noting that each of the components of the social institution in different historical periods is embodied in different organizational forms and goes through its own way of the development. S. A. Basov [20] pointed out that A. V. Sokolov's opinions haven't been demanded for some time by the society, although social institutions, changing over time, constantly embody the function of utility for the society – no matter how this "utility" was understood.

These studies confirm the need for the investigation of the society from the standpoint of social communication. Thus improving the definition given by V. Rizun, social communication is thought of a complex of technologies that implement the functioning of the system of social interaction which provides communicative processes of social institutions, organized communities and individuals.

In this context, it becomes increasingly important to use a systematic approach to the study of the analysis, projecting and construction of the social and communicative system. This issue should be investigated by an individual scientific discipline, which we offer to call the social and communicative engineering.

Social and communicative technologies are used for the full realization of social communication on the condition that the postulate is accepted, which states that if there is social communication, as an object of the study, research and analysis, and if there are technologies that implement this process, then from the point of view of the system organization the need in the development of a particular type of engineering – social and communicative engineering – is an indisputable fact. It is the science that studies the processes of designing, constructing and creating of social and communicative systems.

A new scientific field should be, to some extent, formed similar to social engineering, which has a set of approaches, applied social sciences, oriented to purposeful changes in organizational structures, that determine human behavior and can control it, or – an integrated approach to the studying and changing of social reality based on the use of the engineering approach and the knowledge-intensive technologies [21].

Social engineering is the activity of planning, designing, creating and modifying organizational structures and social institutions; the complex of applied methods of sociology and other social sciences that make the set of tools for such activities. Experts in the field of social engineering are involved mainly in social problems at work or in public relations, and tend to have a complex training in a number of sciences, using in their research and practical activity data of sociology, social psychology, physiology, psychology, economics and others [21].

In the context of a problem under investigation, it should be noted that along with social engineering, which has its object, subject and methodology, another kind of engineering – informational engineering, which has its specific object, subject and methodology is actively developed. P. Kazumi determines the informational engineering as the complex of activities in creation of different informational processes, modeling of the design and implementation methods to realize informational service [4], that in many works of contemporary researchers treated as synonymous with the engineering of data and knowledge.

Social and communicative engineering is a system forming type of social and informational engineering. Social and communicative component ensures the formation of the concept of the society, as the society began to emerge after the appearance of the functions of communication and the implementation of them.

Methodological basis of social and communicative engineering

The formation of the methodological basis of social and communicative engineering involves close cooperation of the wide range of specialists, particularly in information sciences, library science, journalism etc. The process of designing of effective social and communicative systems should be based on the use of the methodology of the system analysis and the theory of modeling.

There is a need of forming rules and clear principles of building of social and communicative relationships in the informational society. Social and communicative

engineering, as the science that studies the processes of designing and creating of social and communicative systems, is in demand, particularly during the formation of the system of relations between members of different parties and political platforms, ideological beliefs of various communities through the establishing of communications, particularly with the engagement of possibilities of the information spreading through social networks. Herewith one should not reject and dissociate from the theoretical developments of the "partial" engineering of K. Popper. The rationalism of his claims, regarding the inadmissibility of approaches to reform of the society based on "non-systematic and gross, but ambitious and decisive application of changes" [23] is of particular relevance in our time. The researcher states that the "partial" engineer must assess as accurately as possible the effect of any size on the public "whole". Within the "partial" approach, the possibility, that a number of "partial" reforms will be inspired by one common trend, is not excluded.

Social and communicative engineering should take into account this aspect in the study of the typical for social institutions social and communicative processes, to ensure the formation of their new organizational and content forms.

According to K. Popper, just as the main task of the engineer-physicist is the design, improvement and maintenance of machines, the task of the social engineer is the design and reconstruction of social institutions, as well as their management [23]. The term "social institution" is treated by the scientist in a very broad sense; it includes organizations (bodies) both private and public character.

The "partial" technologist or engineer knows that projected institutions are only small minority of social institutions, all others are just "appeared", and they are unintentional results of human actions. But no matter how impressed he is by them, the technologist or engineer will look at these social institutions from the "functional" or "instrumental" point of view. He will see in them the means to achieve a certain goal or believe that they can be turned to serve such objectives; they are machines for him, not organisms. Of course, he sees a fundamental difference between institutions and physical tools. The institutions are as fortresses [23]. They should be well designed and equipped with reliable staff. And the last element will be effective while using methods of social and communicative engineering.

The experience of researchers in the field of social engineering, which suggests that new social systems and institutions should be created only in an informational environment, must be taken into account. Such environment creates a certain cultural background, avoiding the blind copying and transfer the samples of foreign culture to the national ground without their prior adaptation and assimilation within existing institutions [24]. K. Popper believed that only a small portion of social institutions was deliberately projected, the creation of their majority is unintentional.

Social and communicative engineering forms rules of the correct construction of social groups, of the setting of internal relations in them and regulations of the building of relationships with the outside world. We shall consider the processes of formation of scientific research groups in setting up of the research within a new research project. The researchers are chosen and scientific problems are defined. The members of the group form social and communicative relations as between themselves, so with the external social and communicative systems.

The social network is a set of agents (peaks) that can interact with each other and between which there are social relations, it is professional, personal, political, religious and others, or ensure the procedures of their social and communicative interaction. From a formal point of view, it is better to present such networks in the form of graphs and to apply for their analysis corresponding mathematical tools [25]. However, the researcher singles out the distinctive feature of the formation of the majority of social network in the context of social and communicative connections as the orientation on the narrow interaction on a horizontal level "personality-personality". Such links provide the rapid spreading of information in the society. The scientist proposes to consider the social networking as software and hardware facility, a complex system, which is characterized by a number of parameters and is analyzed by using the totality of different models – purpose, structure, action in time and resources [25].

The analysis of the peaks and their connections allows creating a generalized idea of the system, which is studied and analyzed with the aim of better understanding and improvement of existing operations, the formation of more advanced system. The methods of modeling and systemic analysis contribute to better understanding of the nature of the information retrieval processes, the improvement of which, usually, allows making better the functioning of social and communicative systems.

Based on the statements of the K. Popper's theory [23] on social engineering, social and communicative engineering can also be divided into partial and holistic (generalized) engineering. According to the researcher, if the methods of engineering are applied partially, then stable things in a team, group and social institution are designed and studied. Using the holistic approach proposed by the researcher, the opportunity to study the general trends in social and communicative processes, which take place in society, is provided.

The study of the communicative interaction of individuals can be treated using the egocentric method inherent to the sociological paradigm of network analysis, herewith the impact of the social world of a single social actor, who is at the center of the system and his connections, are analyzed [26].

The principles of the system approach allow to consider each social and communicative system both as a part of the global system, and as an independent separate complex system of the social and communicative type. A necessary condition for the successful functioning of the social and communicative system is the formation of the components that would ensure its effectiveness. The main basic elements of such a system are informational technologies, informational resources and a number of individuals.

V. Zotov in the monograph "The formation of the informational communicative environment of modern society: a sociological analysis of institutional transformations" proposes to conduct a systematic analysis of institutional changes in terms of the evolution of the informational communicative environment. Using the methodology of social communications as the substantial background for the functioning of social institutions and their analysis in the context of the interactions in the society, culture and personality allowed the author quite deeply describing the formation of informational and communicative environment in terms of modern society. The definition of the informational communicative environment was given by V. Zotov through the system of functions characteristic to the system of social communications. The author singled out at least two main communicative functions: the first, when the informational communicative environment is considered as "a certain infrastructure, organized on the basis of informational communicative technologies and is designed for storage, transmission and processing of large amounts of information"; the second one derives from the fact that "the informational communication environment is a network structure that combines interdependent social subjects that coordinate and agree on their own common activity for satisfying the emerging informational communication needs".

The systems approach

Social and communicative system is presented as the multifunctional material and ideal (conceptual), open, complex, dynamic, determined, teleological (purposeful) regulated system.

The application of main principles and positions of a systematic approach allows clearly formulating the requirements to the social and communicative system:

• the principle of the ultimate goal: the global purpose of the system is an absolute priority, because there is an urgent need for an innovative approach – the implementation of conceptual foundations of removing of barriers in the process of finding an access to information,

• the principle of the unity: social and communicative system should be considered both as an integrated organizational and technological social institution and as a set of separate components (technologies, informational content, etc.),

• the principle of the coherence: each component of the system is considered in the interaction with an appropriate environment,

• the principle of the modularity: the analysis of the social and communicative system is carried out by means of the decomposition into individual components, modules with different degrees of profoundness; the system is presented as a set of modules and the links between them are analyzed,

• the principle of the hierarchy: at formation of the social and communicative system the principles of hierarchical structure of its components are implemented,

• the principle of the functionality: the structure of the social and communicative system and its functions are examined in the context of the priority of the functional tasks of the structure,

• the principle of the development: the formation of the social and communicative system takes into account the possibility of improvement, the ability to develop, expand and store information.

Methods and means of social and communicative engineering provide the formulation of the conceptual goal; allow reflecting adequately the purpose of the social and communicative system that can evolve in time and space. It is said that the purpose of the social and communicative system is a behavioral concept, and communicative processes among the members of this system are extremely important and even are the determining factor in social and communicative systems. While building a system, studying its manifestations, based on social and communicative relations, there is a certain element of uncertainty and the need to consider the risks.

The methods of social and communicative engineering allow us to determine the tactical goals, the achievement of which is made in defined and relatively short period of time – primarily it refers to the organization and the setup of the functioning processes of the system and the formation of relevant informational resources.

Macrogoals are formulated in such a way that they should be achieved in a sufficiently long period of time and the prior obtaining of at least one of the tactical objectives is required. The macrogoal in the context of the social and communicative engineering tasks may for example be formulated as a need for the establishment and the implementation of the separate target socially-oriented program in the building of the effective social and communicative system, which is based on the construction and the use of modern, based on advanced informational communicative media, social networks by various categories and groups of users, within limits of the state.

The necessity to form the following aims should be taken into consideration:

• the functional aim, which is defined by functional tasks of the system and by technological operations, inherent in the system, including the analytical and synthetic processing of information, formation of the informational content, forming of the technologies of the informational support of the users,

• the aim-analogue – an image which is obtained as a result of the activity of another system, as well as under other conditions of the outer environment. the construction of the social and communicative system is based on the analysis of foreign and best principles of domestic experience in this area,

• the aim of the development, or a new purpose, which determines all aspects of the functioning of social and communicative system and mainly involves the integration and the synthesis of the above mentioned objectives. Herewith, the fact that the above types of objectives are internally connected was taken into consideration. The aim of the development, on condition of its successful achievement by the system, becomes the aim-analogue for other systems. For certain social and communicative system, it becomes the functional aim on

terms of constant external conditions and the aim-analogue on terms of changed external conditions.

The modern social and communicative system can be considered as a complex system and an informational factory, which, on the basis of its own and involved from the outside informational resources, creates a wide range of current consolidated informational services and informational products, provides a range of informational services to various categories of users.

Logical-mathematical approach allows us to give the formalized definition, determining social and communicative system as a set, on which a specified ratio in fixed properties is based.

It should be stated that the theory of systems studies the phenomena, based on the research of formal relationships between their elements and changes occurring under the influence of the environment. As a result, only the interaction of the components is analyzed, without the direct explanation of the nature of mechanisms involved in the phenomenon [4].

Thus, the properties of social and communicative system as a whole structure are determined not only by the summary properties of its individual elements or subsystems, but also by the specificity of its structure, special system-building, integrative bonds. In this context, informational social institution is an adaptive multi-functional, open cultural and civilization system, the purpose of which is the promotion of the circulation and the development of accumulated human knowledge by providing free access to it; the saving of documented knowledge as a social, the formation and the imple-mentation of the functioning of the channels of exchange of socially significant information. Being the part of the information and communication system of the certain region, each of them implements the function of the broadcasting of information, data and knowledge in the social and cultural dimensions of time and space, giving the subjects and objects of the communicative process the opportunity to come to mutual understanding within their co-existence.

It should be considered, that the function of system is a combination of processes, which are performed or could be performed by the system according to its purpose. The function of each element should be understood as a set of conditions in space and time, and in interaction with other elements, as by the cooperation of the functions, a new feature that is not found in every single element of the system, quite often emerges.

The starting position is the presence of the main features of social and communicative system:

1) the simplest units – elements that constitute this system, in this work informational resources and technologies;

2) subsystems – the results of the elements interaction. In this research such subsystems as electronic libraries and digital collections, are highlighted;

3) components – the results of the interaction of subsystems that can be studied in relative isolation, without the connection with other processes and phenomena. In this investigation – the setting up of the interaction "user – a document";

4) a certain level of integrity, which is featured by the system that due to the interaction of the component receives integral results of the operation;

5) system-building connections that bind components and subsystems as parts of a single integrated system. In our investigation it is the interaction between subsystems "electronic library", "digital collections", "user";

6) connection with other systems of the environ-ment – the participation in the processes of social and documentary communications.

The methodology of the systemic analysis is based on well-known laws of interconnection and interdependence of phenomena that in the context of social processes requires the analysis of social and communicative systems not only as independent systems, but also as the constituent elements (subsystems) of a much larger system. For social institutions of information industry the structure of a higher level is the system of documentary communications that includes the following components: author – editorial office – printing – distribution of documents – social institution – user, which in its turn is a constituent of the social and communicative system.

Applying a systematic approach to the study of the social and communicative system allows us to define it as a complex self-regulated system, formed in the process of the interaction between the user and the document, the exchanging of information with other elements of the environment. The bonds that are formed as a result of these processes affect the overall development of social institutions and determine their place and role in the informational society.

Any social and communicative system is not isolated from the outside environment; on the contrary it is connected with that environment by bonds through which it makes a certain influence, realizing its purpose, and achieving by its functioning the particular aim. In addition, there are other types of relations that influence and act on the system itself on behalf of the external environment. These relationships are important in the study of the processes of the exchange of information between the system and the environment, and between elements of the system, which ensure the realization of the basic functions of the system. The research and the analysis of the bonds allow us to discover the objects not directly, but indirectly, through other objects that stand in some interrelation or interconnection with them.

Social and communicative system is characterized by several types of relationship:

• interactions (coordinations), among which connections of properties and connections of objects should be differentiated. Their specific is that they are mediated by the goals that are set by each component of the interaction,

• procreation (genetic) when one object is the basis, that brings another object to life,

• transformations, among which we distinguish those that are implemented through a specific object, providing this transformation, and those that are implemented by direct interaction of two or more objects, during which or through which these objects together or separately move from one state to another,

• forming (structural), which provide that the presence of some elements of the system necessitates the existence of other elements that interact with the first,

• operation, that provides the activity of social and communicative system. Its components are combined by such bonds that together perform a certain function. These bonds are divided into the bonds of the state (when the next state is a function of the previous) and functional bonds (where objects are related by the unity of the realized functions),

• development, which is considered as a modification of functional relationship of the system and the bonds of its states. The main meaning of this process is quite significant changes in the structure of the system and forms of organization of life. From this perspective, the functioning of the social and communicative system is the movement in the state of one and the same level, which is associated with the redistribution of its elements, functions and bonds. Thus each subsequent state either is directly determined by the preceding one, or anyhow is "re-informed" by the whole construction of the object and does not go beyond its history. The development of the social and communicative system provides the updating of its potentials, and leads to a sharp change of the functioning forms. Thus, the social and communicative system reluctantly goes to a higher level of functioning on the condition of reorganization of the organizational bases of its activities,

• management, which, depending on the specific type of technological embodiment can form a kind of functional relationship or relationship of the development.

Typical examples of a social and communicative system are social networks. For example, exploring social networks of scientific communities, in which co-authorship of scientists during the preparation and the publication of scientific papers is fixed, the inherent relations and the spread of scientific information can be seen. These communities usually combine more than one million members. Their functionality is investigated using the appropriate models. The model of the network of the scientific community M. Girvan, M.E.J. Newman offer to present in the form of a graph, whose peaks are individual scientists, and joint publications are treated as bonds between them. The emergence of several joint publications promotes the formation of several parallel connections.

The mathematician Paul Erdosh, who has long studied the network of the co-authorship, in his fundamental works proposed to use certain metrics of the cooperation activities in the research community network.

I. N. Trofimova suggests using a model of social behavior for the prediction of the behavioral strategies, which play a significant role in the study of social networks. The given model takes into account the impact of several factors on the behavior of the community: the influence of the environment, the population size, the ability to establish contacts (sociability) and the degree of difference of the elements. Modern social network is a modern and popular tool for communication.

The information in social and communicative system should be considered as from the standpoint of its receiving, storage, transmission, conversion, filtering, and also from the position of its use in the communicative processes. Informational flows are considered in interrelation with certain structural schemes that have some common features: the sources and consumers of information volume, the forms of presentation, the direction of transmission, the place and the type of storage and others. These structural schemes are used for the analysis and minimizing the data flows and the reducing of their volume, identify as duplication of information, so the duplication of ways of its transmission and others. The concept of information has a high degree of universality and in the general sense the functioning of social and communicative system is considered as conversion of input data in the output one by means of taking certain decisions in the system.

It should be noted, that social networks are one of the areas of interest of social and communicative engineering.

CONCLUSIONS

Thus, having conducted the thorough analysis, we can state, that one of the urgent needs in the formation of informational society is the continuation of forming a new kind of engineering, which is social and communicative engineering, that is described as a set of methods, tools and means which by their systematic use allow to design and create qualitative and efficient social and communicative technologies and systems.

There is an urgent need to develop rules of the construction of social and communicative groups, forming the correct processes of communication in their environment and the establishment of the effective internal and external social and communicative relations. Social and communicative groups and systems (including social networks) – are objects of study, research, design and construction of social and communicative engineering. The adoption of this paradigm allows avoiding spontaneity in the formation of the social and communicative system, to ensure the correct formulation of problems, to choose the correct and effective methods of their creating and designing. The subject of the research is social communication and social and communicative processes, herewith the social and communicative engineering uses general scientific methods of research, and, also the techniques, inherent to engineering and humanitarian sectors.

The tools of social and communicative engineering should develop models of describing current social networks, using the methods of various branches of science, the powerful mathematical tools, including developed for physical phenomena and processes of the material world, as clear analogies between natural phenomena in "inanimate" nature and processes of functioning of social groups, communities and networks are traced. This science-based and methodologically revised approach can ensure the correctness and predictability of the development of social and communicative system.

The system science approach to social communication allows clearly formulating the requirements to social and communicative system.

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