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Destructive Communication in the Information Space

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Abstract*: *Paper The article is devoted to the analysis of the functioning of destructive communication in the information space. It has been established that the main element of the communication process is the transmitted information, which comes in the form of text messages. The authors have determined that the language of Internet communication has certain features. This is due to the fact that several character systems can be used at the same time. It has been proved that a model of a social and communication network in the matter of determining its elements may have a certain discrepancy with the general provisions of the network approach. This mismatch can be addressed by verifying that these elements match the key characteristics of the links that create the network format. The reliability of the presented procedure for the analysis of destructive communication is confirmed by the fact that it reduces the number of analyzed objects by the factor of 2.5 and moves from the level of post-fact response to the level of the forecasting and taking preventive measures.

Keywords*: *destruction, communication, information, Internet, system, space, consciousness, forecast, technology.

I. INTRODUCTION

Modern Russian society is increasingly acquiring features of an information society. In this case, the central role in the formation of the information society is played by information technology, i.e. communication with a remote partner or group, mediated by telecommunications systems, takes the form of virtual communication. Many of these virtual communications create a new, virtual space. It differs from the real, material world in basic concepts, such as thoughts, images and information.

Under virtual space, researchers understand the Internet space, which, unlike print or broadcast, has virtually no boundaries. Any amount of information can be placed and will not be limited by the broadcasting time of a program or the number of printed characters. Therefore, the communication carried out in the Internet space gradually replaces traditional mass media in the process of forming mass consciousness, informing society about current events, activities of public authorities and their institutions,

reflecting the reaction of society to the decisions and actions of the authorities and disseminating political, socio-economic, legal and cultural ideas and knowledge.

The daily audience of Internet users in Russia is 59% and it has recently grown by more than 30%. Therefore, it can be said that the number of communications made via the Internet is growing every day. At the same time, it is impossible to say what technological opportunities will appear in 5-10 years but today it is possible to conclude that the Internet space will soon radically change people and turn them into subjects very different from modern contemporaries.

The study of issues related to the formation of communications in the information space is reflected in the works by K. O. Gnidko [1], A. A. Lisenkova [2], L. N. Solovyova [3], A. A. Fadeeva [4] Z. Chanysheva [5], J. M. Shaev [6], etc. It can be argued that there is an objective need for further research on the problem of destructive communication in the information space without diminishing the significance of theoretical achievements associated with the problems of forming communications.

II. METHODS

The theoretical and methodological basis of the research includes the abstract-logical method, methods of induction, deduction, analysis, synthesis and systematization used to justify approaches to the development of communications in modern society, as well as graphic methods used to study the level and development trends of communication in the information environment.

The information base of the article consists of statistical data of state bodies, as well as legislative and regulatory documents regulating social prerequisites for the development of destructive communication in modern society [7-9].

In the process of the research, it is planned to improve approaches to the analysis of destructive communication, to develop measures for coordination of activities between the main participants of destructive communication and to justify the position on the formation of intercultural communication, ensuring the rational development of the individual.

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III. RESULTS

Research suggests that the Internet is increasingly becoming a new form of social reality. The new reality skillfully presents its advantages and deeply hides its shortcomings. Among the latter, the following should be noted: uncertainty and underdevelopment of social norms (including legal and moral), which, to a large extent, strengthens destructive tendencies in the process of communication. As a rule, the main element of the communication process is transmitted information. On the Internet, basic information from the interlocutor comes in the form of text messages. It is possible, of course, to complement the communication with graphic and video elements. However, a text message remains the central element in a situation where the purpose of communication is the expression of a certain position. At the same time, the language of Internet communication has certain features. This is due to the fact that several character systems can be used at the same time: alphabet, numbers, mathematical symbols and punctuation marks. It is also possible to use a specific language, the basic element of which is a smiley. A smiley is the name of a text or graphic symbol that gives the message an emotional touch. Most of them are stylized images of a human face, experiencing various emotions. Such polysymbolism of the generated messages greatly complicates the use of traditional methods of text analysis. In this connection, there is a need for a methodology that overcomes the difficulties, which arise, and provide an opportunity to identify and track destructive communications in the information space. In the proposed methodology, as a unit of analysis, we consider a message, but not it's content, and its spatial organization in relation to similar units. To do this, we denote a message with two variable parameters: author and recipient. The author option allows organizing the structure and the recipient option allows establishing a link between messages. Initial information (message), as a rule, is independent (a fact, an element of social reality). Messages that appear as a reaction to initial information are dependent. Many dependent messages can form a social and communication network. Under social and communication network, we understand a set of links configured on the basis of communications of social subjects in the process of understanding some element of social reality. Figure 1 shows a block diagram describing the logic of building a social and communication network.

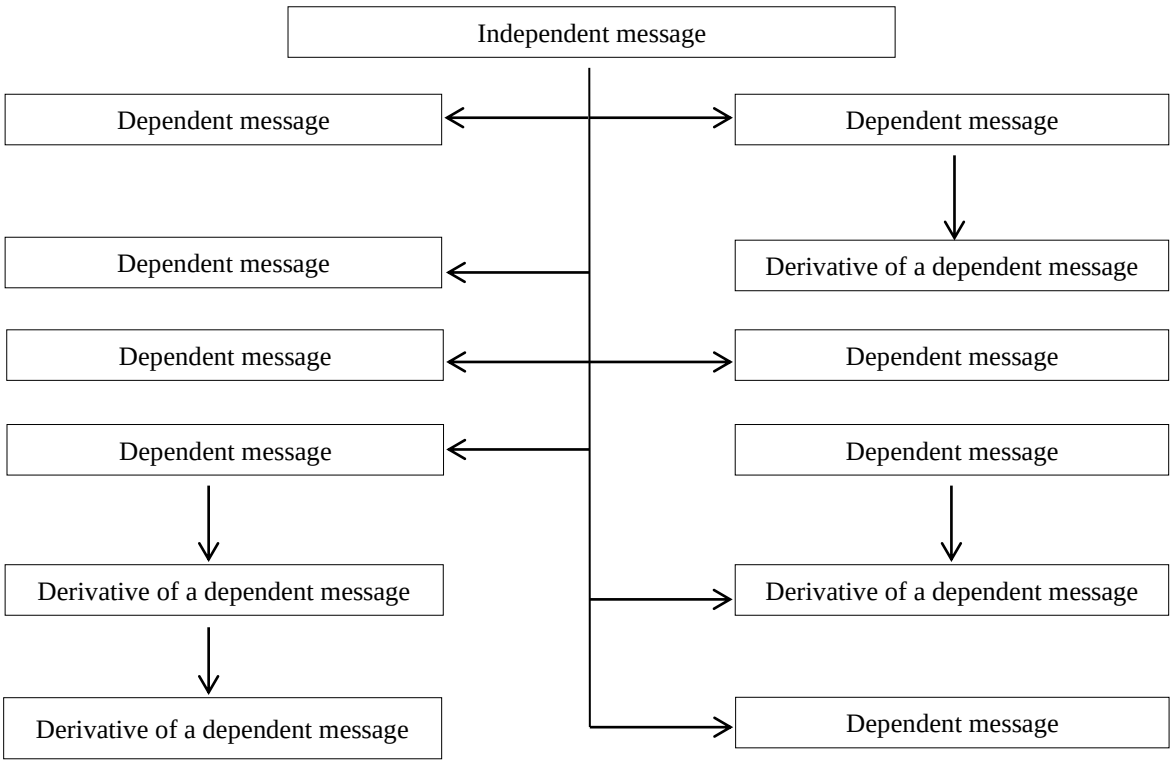

Fig. 1: Block diagram of social and communication network construction

Studies show that the postulates of network analysis include the following statements: a social network is formed in the process of communication; a network contains a set of objects and a map or description of relations between objects, that is, links that exist within a network; they can be individuals, groups of individuals or social institutions created by them in a social environment.

The model of the proposed social and communication network may have a certain discrepancy with the general provisions of the network approach in the matter of determining the elements of the network. This mismatch can be addressed by verifying that these elements match the key characteristics of the links that create the network format:

1) Discretization nodes must be separated from each other to be able to be connected;

2) Similarity: nodes must be similar in key characteristics and fit together to form a link;

3) Proximity: nodes must be localized in relation to each other, i.e. correlate spatially, geographically, co-exist in time;

4) Reciprocity as a feature of network links: there is an exchange between groups of elements of a network; thus, the asymmetric character of interaction is essential.

All these characteristics fully correspond to the objects of a social and communication network and relations established within it. At the same time, it is proposed to use the conceptual and categorical apparatus in the construction of social networks, as well as methods of visualization and mathematical apparatus of graph theory. Let us consider the main points of graph theory and network analysis.

A graph is a collection of a set of vertices (usually denoted by points or circles) and a set of links connecting some pairs of vertices. In order to define a graph, it must be specified. One of the ways to define a graph is matrix representation. The graph is proposed to be defined by the adjacency matrix: it is a square matrix $A=||x_{ij}||$ with the dimension nxn, where n – is the number of vertices of the graph, which uniquely determines the relationship between the vertices of the graph.

Table 1 shows the adjacency matrix of the graph, with a dimension of 5x5. The value of 1 in the matrix indicates a situation where there is a link between the vertices and 0, respectively, when there is no such link. The adjacency matrix of the graph is symmetric with respect to the principal diagonal.

Table 1: Graph adjacency matrix.

	x_1	x_2	x_3	x_4	x_5
x_1	0	1	1	0	0
x_2	1	0	1	0	0
x_3	1	1	0	1	1
x_4	0	0	1	0	0
x_5	0	0	1	0	0

One can find the characteristics of the vertices using the graph adjacency matrix. Thus, the sum of the elements of the i-th row (or j-th column) of the matrix gives the degree of the i-th vertex of the graph. For example, the degree of the vertex x_3 of the graph given by the matrix in Table 1 is $d(x^3)=4$. The degree of a vertex of a graph is the number of link-lines of this vertex with others.

The most common tasks of network analysis include segmentation, density and cohesion research, block building and similarity detection. We are interested in the problems associated with the assessment of density and block building in the process of network analysis focusing on the methodological principles of the study. In this case, the network density is the ratio of the number of links available in the network to the maximum possible number of links.

The maximum possible number of links in a graph can be determined by the formula $\frac{n(n-1)}{2}$, where n is the number of vertices of the graph. For the graph shown in Figure 2, the maximum possible number of links is 10, the available number of links is 5, hence the density will be 0.5. The network density is between 0 and 1.

To analyze a social and communication network, we consider an indicator characterizing the share of links coming to the initial top (independent communication) to the total number of established links. In Figure 2, vertex x_0 is initial; it corresponds to three edges (links). The total number of established links in the graph is 16; thus, the share of links falling on the initial vertex is 18.7%. This indicator takes values in the interval [0%, 100%] and shows the degree of involvement of an independent message in the social and communication network.

If the initial vertex accounts for a small proportion of links, this means that the dominant role is shifted towards dependent messages in a social and communication network. This occurs in a situation where the initial information (independent message) causes conflicting multidirectional estimates. We introduce the concepts of centralization/decentralization to describe the considered dependencies. Centralization involves a high degree of involvement of independent communication in the social and communication network and decentralization is the reverse process.

We divide the entire range of permissible values into five parts, which have the following qualitative and quantitative interpretation: under 20% – strong decentralization; under 40% – average decentralization; under 60% – poor decentralization; under 80% – strong centralization; over 80% – high centralization. Let us consider the presence/absence of structural blocks – a subset of the vertices of the network and a subset of their links – to identify the topological model of a social and communication network.

The peculiarity of block formation in a social and communication network is associated with forming their subgroups (factions), where a faction is when two actors are united by intense mutual links (interrelated shortest paths one step): $x_2x_1x_5$ (Figure 2).

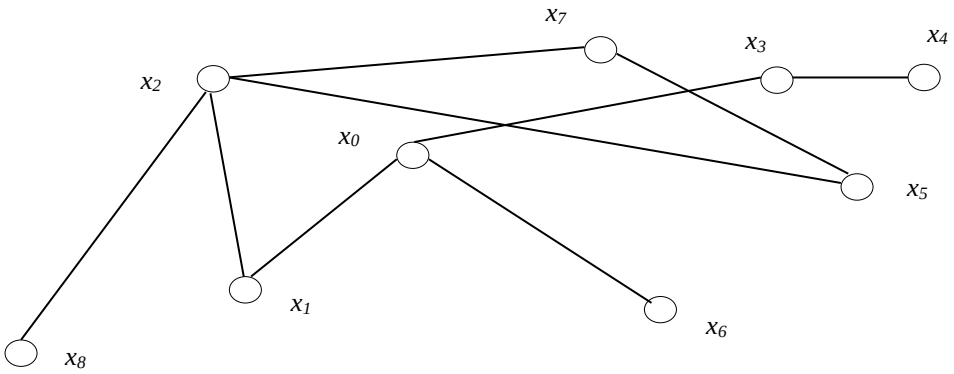

Fig. 2: The graphic image of links in destructive communication

Such types of subgroups are rare in real social systems. The manifestation of the block structure generated factions, along with the low shares of primary vertices (an independent report), attests to the destructiveness of established communication.

We illustrate the proposed methodology by the example of the analysis of a social and communication network formed during the discussion posted under an Internet video clip. After formalizing the set of messages, we highlighted the appropriate parameters: author and recipient. Now, there is an opportunity to build a social and communication network. To do this, first, it is necessary to set the adjacency matrix, which reflects the established links between messages.

Studies show that the total number of links in the studied social and communication network is 47 (the sum of all degrees of vertices). The share of links attributable to the starting vertex x0 is 19.1%, which indicates a strong decentralization of the established relationship. In this case, the topological model of a social and communicative network demonstrates the shift of the dominant role in the network towards dependent messages, as well as the allocation of the structural block formed by subgroups.

Given the low share of participation of the initial vertex in the formed social and communication network, it is possible to conclude that this network has the character of destructive communication. This, in fact, is an intermediate result allowing a huge array of communications carried out in virtual space to identify destructive communications.

The next step is to identify messages that directly define destructive communication. To do this, it is necessary to discard all vertices (messages) with a degree of not more than 2 since they are dead-end within the framework of the constructed topological model of a social and communication network. This is due to the fact that the vertex with degree 1 does not cause resonance and, therefore, does not determine the content of communication. A vertex with degree 2 acts as a connecting component, which excludes originality and significance within the established social and communicative network.

IV. DISCUSSION

The reliability of the presented procedure is confirmed by the fact that it reduces the number of analyzed objects (vertices) by the factor of 2.5 [10-12]. This is important because, ultimately, there will be a task to determine the immediate content of destructive communication due to the fact that content analysis has a very high applied value. It allows moving from the level of post-fact response to the level of forecast and prevention.

Studies show that two out of three reports are destructive. A clear fixation of the concept of one quite clearly indicates the existing destruction. After identifying messages – reasons for the formation of destructive communication – one can distinguish those that have the most pronounced attitude aimed at the formation of readiness for certain actions.

This characteristic reflects the ratio of vertices derived from dependent vertices (messages), i.e. not having a link with the initial vertex. The peculiarity of this ratio can be established through the definition of the installation activity, which is understood as the frequency of communications passing through a particular link.

Therefore, the proposed method of analysis of virtual space allows formalizing it through the allocation of social and communicative networks. The topological model constructed on the basis of these networks reveals networks with destructive communication. At the same time, the analysis of the content of the initial message will make it possible to evaluate the topics that cause the formation of destructive discourse. Given the fact that the proposed method is based on mathematical theory, this allows transferring it to the level of a software product, which will provide a high-performance analysis of virtual space.

V. CONCLUSION

Summing up, it can be noted that the main element of the communication process is the transmitted information, which comes in the form of text messages. It is possible to supplement communication with graphic and video elements. However, a text message remains the central element in a situation where the purpose of communication is the expression of a certain position.

It has been determined that the language of Internet communication has certain features. This is due to the fact that several character systems can be used at the same time: alphabet, numbers, mathematical symbols and punctuation marks. It is also possible to use a specific language, the basic element of which is a smiley. Most of them are stylized images of a human face, experiencing various emotions.

It has been proved that the model of a social and communication network may have a certain discrepancy with the general provisions of the network approach in the matter of determining the elements. This mismatch can be addressed by verifying that these elements match the key characteristics of the links that create the network format. At the same time, the most common tasks of network analysis include segmentation, density and cohesion research, block building and similarity detection.

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