Ecological engineering in mass media

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Abstract. This article raises the problem of ecological engineering, taking the problem of unfavourable ecological conditions in Krasnoyarsk as an example and showing the way mass media and social networks illustrate it; how much the information on this problem is available for the citizens. Publications of four groups on social networks have been analyzed by means of content-analysis method of groups with different range of users’ activity. Semantic syntax method has shown the possibility to study the attitude of Krasnoyarsk citizens through the situation of action. The conclusion after the research is thesis of the necessity of conversation about ecological situation in the city between population and government, otherwise ecological protest campaigns might interfere political life.

1. Description of situation, problem setting
Some years ago it was planned to build a ferroalloy plant in Krasnoyarsk, which would have aggravated the ecological situation in the city. In order to stop the construction of the plant citizens organized several meetings and strikes and arranged protest campaign in social networks. After the mentioned above problem the population of the city ask themselves if life in Krasnoyarsk meets the high ecological standards. The answers are given in media, social networks and public discussions.

The most frequently mentioned environmental problem of the city and the whole region is emissions of harmful substances into the atmosphere, which regularly “cover” the city. This phenomenon has been called “negative weather conditions” or “black sky conditions”. For example: in Krasnoyarsk negative weather conditions have been announced for the weekend. They are supposed to last till Monday, February, 11th. These conditions in Krasnoyarsk and Minusinsk started on February, 8th at 19.00 and would last till February, 11th at 19.00. Under weather conditions during the period the air in the city would accumulate harmful elements at a high concentration rate. In such situation specialists from Siberian Ministry of weather and environmental condition monitoring recommend not to spend much time in the open air and, if necessary, use protective masks. Besides, it is necessary to keep flats clean. Last time the “black sky conditions” in Krasnoyarsk were announced in 2018 and it lasted till the New Year’s Day. In Minusinsk they were detected on the 15th and 16th of January 2018. Lately Minusinsk has been mentioned in the news about ecological problem quite often. But ecologists think the reason for this fact is not the aggravation of the air. According to Sergei Shakhmatov, an ecologist, who explained in the talk on TVK channel that the town now has got the equipment to monitor the conditions of the air.

Information about ecology is always on the news agenda of regional channels. Thus, every Tuesday the news of TVK channel give a detailed analysis of air in different parts of the city telling which
harmful substances are present in the air, how much the density of them is and how much higher than the norm it is. For instance, from April, 4th to 11th, 2016 according to TVK channel, residents of the Oktyabrsky district inhaled hydrofluoride, with concentration exceeded in 1.2 times. Benzene and ethylbenzene were detected in the air of the Zheleznodorozhny district, the concentration of the latter was 3.5 times higher than the norms. Also, these substances were found in the air of the Leninsky district, their concentration was exceeded in 1.5 times. Residents of Severniy and Cheryomushki again breathed in nitrogen dioxide, in Severniy its concentration was 4 times exceeded, in Cheryomushki it was 1.5 times higher than admissible.

Furthermore, the channel often highlights ecological topic, giving the news about public discussions or protests etc.

On the channel website there is a project “Black-sky city. Myths and facts of Krasnoyarsk ecology”. The author is Ekaterina Waiss. The project has the form of frequently asked questions about smog in Krasnoyarsk: what “negative weather conditions” mean, origins of the problem, reasons: natural (landscape), economical (construction of Hydro electro station), municipal (bad system of public transport, cutting down the trees) etc. The answers are given by the experts in the spheres, for example, A. Menshikov, Head of the Municipal development institute; V. Kirillov, Head of the Laboratory for Aquatic Ecology, Institute of Water and Environmental Problems, Siberian Branch of the Russian Academy of Sciences (Irkutsk); A. Kolotov, Chairman of the Environmental Chamber of the Civil Assembly of the Krasnoyarsk Territory etc. Besides, graphs and charts are presented (for example, change in number of cars over 10 years, 2007-2017).

A Krasnoyarsk resident watching daily TVK news receives the necessary information from the TV (ecology stories are published 2-3 times a week), and the young digital generation viewer gets information from the television company's website, from social networks. The advantage of the young viewer is worth mentioning, as he does not depend on time and place and receives information from his smartphone in real time, he can also track information on the Internet on different resources.

Apart from information about quality of the air in the city, Internet websites give users the opportunity to discuss the questions and express their opinion on the topic. Public organizations and citizens with active social position use the Internet to form public opinion on environmental issues. It should be noted that over the three months of 2019, the social activity of city residents in this area has increased significantly due to the XXIX World Winter World Student Games (Universiade) in Krasnoyarsk, and consequently, the number of regional media and private messages have increased as well. If in the past mainly the television media formed the theme of the day, now the leaders of public opinion are Internet-active citizens, drawing attention to the most important topics. Accurate and balanced facts are provided by official media, but it is impossible to realize the social role of news as a catalyst of democracy and citizen ethics without emotionality and humanity. Robot-like journalism, as Matt Carlson calls it, can focus public attention on the present, while the emotional context, vivid quotations and references to personal experience of Internet messages motivate users to act, form a behavior strategy for socially active groups of the population. Thus, environmental management is gaining more and more democratic features.

2. Theoretical justification
The object of political management in the field of ecology is not only ecological, but social processes. Therefore, engineering activity in solving environmental problems can be effective. On the one hand, environmental engineering is focused on innovations in production. On the other hand, engineering accompanies the key stages of the innovation process, ensuring the effectiveness of information flows, the interaction of government, society, science and business.

Social processes and changes that happen in the society and, particularly, in the ecological sphere, are one of the most difficult object of management due to a number of reasons [2]. Firstly, the understanding of social processes that accompany environmental problems is not sufficiently studied and understood. In addition, the subject of knowledge is a human, who is included in the processes under study, which means that the objectivity of the research decreases. Secondly, a detailed
description and a conscientious analysis of social processes and their development trends, which entail active intervention of the socially active population in the course of social processes, sometimes contradict the vital interests of the economically interested party. This kind of situation is characteristic of monopolists in the field of energy. Thirdly, there is an objective difficulty in choosing adequate management methods, even when it comes to solving specific environmental problems. It is almost impossible to predict the consequences of implementation, especially those remote in time. In addition, methods for solving environmental problems are often associated with industrial innovations, the public reaction to the latter is unpredictable. Perhaps, the Everett Rogers innovation diffusion theory is applicable here, in which the analysis of information distribution channels plays a crucial role and allows predicting the consequences of adopting technological innovations [3]. Fourth, even the correct choice of management methods in the field of ecology does not guarantee the effectiveness of management activities, because in solving environmental problems it is difficult to take everything into account, or at least the main factors causing the development trends of society. The "human factor" can reduce the effectiveness of even the most reliable technical systems. Therefore, for political management in the field of ecology, it is necessary to predict the development of the object of the planned changes. The forecasting stage should precede the goal setting and, on the basis of scientific research, determine the future development of society, the existing positive and negative trends of its development, the main factors affecting this process [2]. Thus, at the stage of forecasting, a scientifically based judgment is made about the possible states of the object in the future and about alternative ways and terms of their achievement; At the goal setting stage, reference points and development priorities of the facility are determined.

It should be noted separately that the initiative groups of citizens who do not have authority, but have ideas and certain proposals for solving problems of significance to the state, have the opportunity to participate in the preparation of strategic planning documents. In Krasnoyarsk there are initiative groups of citizens, focusing the attention of the public and authorities on the environmental problems of the city. Currently, city activists have an opportunity to solve problems in the field of ecology at the legislative level together with the regional government. Project activities in the field of environmental engineering give the wide use of human potential in conjunction with scientific achievements (innovations) and business initiatives. The result of this practice may be new approaches to addressing environmental problems that will contribute to the development of the region and improve the quality of life of citizens. Activities in the field of environmental engineering may face various obstacles. For example, one of them may be the lack of citizens' interest in preparing proposals for priority environmental projects and the insufficient level of their qualifications. Innovative solutions to environmental problems may also come across misunderstandings among citizens, which also makes it difficult to implement a priority project. Therefore, the study of information dissemination channels on the problem under study, especially the media and channels of interpersonal communication, is so important for formulating a forecast of the development of the situation and achieving the goal as a whole [2].

In present research (work), we analyzed the texts of users of social networks from the standpoint of semantic syntax, the object of which is the action situation displayed in the sentence, and its semantic model, that is the proposition. From the point of view of L. Teniera, a sentence is a tree defined by syntactic connections of words, and a predicate is a vertex that is associated with actants, filling its valences. The basis of the sentence as a linguistic fact is an extra-linguistic fact, according to the theory of linguistics - a denotation representing not a separate subject, but an event or situation. The semantic organization of the sentence, its components and their representatives, the mechanisms of interaction between the elements of the situation have become the object of research for linguists [4; 5]. In the analyzed material, users of social networks, who are the residents of the city, environmental activists, act as subjects of the situation. In addition to them, the structure of the situation includes the motive of the act, the action component (description of the event defined as the act), explication of the violation of the norm (the act is overcoming the normative boundary in behaviour, one’s own or public), assessment (positive or negative), social and personal consequences / result. To study the
content of Internet resources, the participants of the situation were identified as a doer, impulse of action, definition of the situation, social and personal consequences.

3. Research

The Internet is a space for intercultural and intergenerational communication, as well as a place for the development of a dialogue between the government and the population. Different social groups present themselves and their position on the Internet, thereby achieving the necessary social changes for themselves, for example, through the triggering of various public discussions. The main Internet resources devoted to the ecology of the urban atmosphere of the city of Krasnoyarsk are specialized accounts, such as the “Nebo.community” on Instagram (https://www.instagram.com/nebo.community) and the group “For the Clear Sky” on VKontakte (https://vk.com/wall-143720880), which appeared due to the development of the project of Igor Specht “Krasnoyarsk. Sky”. There are other Internet sites where this project is being implemented, but they are currently inactive. There are regular publications in which problems of the state of the atmosphere of the city of Krasnoyarsk are discussed, for example, in the group “Zhivoy Krasnoyarsk” on VKontakte (https://vk.com/wall-39394191?own=1) and on Instagram on the page of the mayor of Krasnoyarsk Sergey Eremin.

From February 1st to February 21st, 2019, the above-mentioned Internet resources were analyzed using the content analysis method and the number of publications on the state of the atmosphere of Krasnoyarsk and the number of comments to these publications are presented in “table 1”.

Table 1. The results of the content analysis publications about atmosphere of Krasnoyarsk.

| Internet resources                                      | Number of publications about atmosphere of Krasnoyarsk | Number of comments to the publications | Discussion intensity level |
|--------------------------------------------------------|--------------------------------------------------------|----------------------------------------|-----------------------------|
| «Nebo.community» on Instagram                          | 54                                                     | 5264                                   | 97.5                        |
| «For the clear sky» on VK                              | 66                                                     | 959                                    | 14.5                        |
| «Living Krasnoyarsk » on VK                            | 18                                                     | 822                                    | 45.6                        |
| the page of the mayor of Krasnoyarsk Sergey Eremin on Instagram | 7                                                      | 35                                     | 5                           |

The maximum of publication activity is noticed in specialized public groups, such as “Nebo.community” on Instagram and “For the clear sky” on VK. The number of publications in the resources of the project “Krasnoyarsk. The sky” is several times larger than in other studied sources: materials are published there every day. In addition to news about life of the city, the atmosphere monitoring data of Krasnoyarsk is daily published in the specialized sites.

Discussion of materials on environmental problems of the city of Krasnoyarsk has a heterogeneous intensity. The level of discussion intensity was revealed as follows: the ratio of the number of comments to the number of publications. For the analyzed material, the indicator is from 5 to 97.5 comments to one publication. The most popular space where citizens discuss the materials of the ecology is on the “Nebo.community” on Instagram (intensity level 97.5) and the least amount of comments on the Instagram page of the mayor of Krasnoyarsk Sergey Eremin. It should be noted that under publications which do not have a common theme with the environmental problems of the city (for example "Construction of schools in the Pokrovsky district", "Main ski race", "Krasnoyarsk is the soul and strength of Siberia", "Squares, landscaping", "Visual aesthetics of the city", “Preparing appliances for warming”), users of social networks also leave comments about the unfavorable state of the atmosphere of the city.

Thus, the main source of information about the attitude of Krasnoyarsk residents to the environmental problems of the city’s atmosphere is the ‘Nebo.community’ group on Instagram. This also confirms the analysis of the content of Internet resources by category: doer, impulse of action, definition of a situation, social and personal consequences.
In the “Living Krasnoyarsk” and on the Instagram page of the mayor of Krasnoyarsk Sergey Eremin, the comments are mainly evaluative and determine the personal consequences of the environmental situation: “We will never begin to breathe,” “…that everything depends on the authorities”, “the future depends on the people themselves”, “The ecological situation in the Russian Federation is systemic. It touches everyone. Moreover, this applies to all people on the planet. We have a strong influence on each other, it is foolish to deny it”. (original punctuation and spelling of authors of posts was retained).

In the group “Nebo.community” on Instagram and the VKontakte group “For Clear Sky” the content of publications and comments presents all the elements of the semantic model of the act. Let’s consider the example of organizing filming a video on an environmental topic, showing this on the example of a call to support the shooting of the video. Doer: members of the group “Krasnoyarsk. Sky”. Action impulse (invitation to shoot a video): “Friends, tomorrow we will shoot a video for the track “I want to breathe”. We need people to whom the image of smoking pipes will be projected. This is a non-profit project, there are no calls, searches for guilty and political slogans. Perhaps with the help of this video we can unite more efforts of all residents, and no matter if you are an official, a businessman, a worker. It seems we should take care of the future right now. Filming will take place on the embankment near the Center of Culture and history on February 19th at 20:00. It may take you about an hour (a rap track). This is not a strike nor a meeting, but filming of the residents of the city”.

Definition of the situation (description of the event, defined by the participants as an act): “The people are afraid to participate in such actions”; “will it not be judged as a massive gathering, our authorities know only how to disperse the crowds, it our days the patrols are on every corner”; “Today we’ll see how many people really want to help, and who is just rending the air.”

Social and personal consequences of the act (result): “I will come. Not alone. With the whole family. To express my citizenship. As if I am sitting on the couch and looking at such initiatives through the phone screen, I will live in the society that I have and not what I want. It is very ingenuous to believe that ‘suddenly a magician will arrive in a blue helicopter. ‘The time to move from words to deeds has arrived. Guys, we are with you, ”Guys, thanks for the initiative, together we are strong!”

The analysis of the content of Internet resources has shown that participation in the project “Krasnoyarsk. Sky” requires from environmental activists courage and determination, perceived as an act. From the point of view of the semantic model, all elements of the situation are realized. The act overcomes the generally accepted regulatory boundary in behavior postulating loyalty to the actions of the authorities. The result (the possible consequence of the act) is presented in the activity and emotional form.

4. Conclusions
The environmental situation in the city requires discussion at all levels of government with the involvement of environmental scientists, business representatives and Krasnoyarsk citizens not only on the basis of the critical atmosphere monitoring data, but also on the emotional intensity of the posts of city residents. They are ready for action in the struggle for the right to live in an environmentally safe and healthy region, as evidenced by the planning of pickets and meetings. The strategy of environmental engineering is not only in solving the environmental problems of the city, but also in forming a dialogue, in building trusting relationships between the population and the administration of the city.

Based on the content analysis of the texts of users in social networks, it is possible to predict that if the dialogue between the population and the authorities about the environmental situation in the city fails, the environmental protest movements can move into the sphere of political life.

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