Identification of Marked Lexicon and Its Contextual Features in Social Networks

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Abstract. The article is devoted to the study of lexical and contextual features of the Censor.NET blogosphere. For this purpose following tasks are solved: to identify and organize the marked lexicon of posts on the chosen subject; to establish contextual features of the use of marked lexicon; to identify the use of marked lexicon depending on the affiliation of bloggers to different professional groups. Marked common lexicon, single-word terms, and phrases used in posts devoted to the subject of Russian-Ukrainian war are analyzed and systematized. There have been processed 400 posts of 80 top bloggers belonging to 16 professional groups. Marked words about the realities of the Ukrainian side are presented in the posts of all professional groups. Marked words to denote the anti-Ukrainian side are not represented in the posts of judges, educators, and scholars. Marked words referring to the Ukrainian side and the anti-Ukrainian side, critically cited from Russian propaganda, are used by bloggers whose activities are directly related to the war. Lexical units segregated in the blogosphere's posts by the characteristics considered could be used when embedding words into frames to detect the moods of users of social networks, to identify sarcastic, trolling texts.

Keywords: blogosphere, lexicon of blogosphere, trolled text, word interpretation, propaganda, communication technologies.

1 Introduction

1.1 Problem statement

The use of marked lexicon in social networks has become widespread, given the huge potential for influencing users' attitude and behaviour. Identification of the marked lexicon makes it possible to establish trends in public disposition, identify systemic links between external (behavioural) and internal (cognitive) patterns and the role of social networks in their modelling. The question of the use, identification, classification and impact of marked lexicon on person and society is an actively discussed topic.

1.2   Methods.

To formalize the process of identifying the lexico-semantic specificity of the blogosphere's content in the projection "professional group of bloggers → subject of posting" we use the tool of content analysis. Marked lexical units, which represent the texts of the posts within the chosen topic are identified to achieve this goal. Units of analysis are marked common lexicon, single-word terms, and phrases.

To select a topic, we used criteria that allow comparing characteristics objectively:

— maximal representation of the topic in the posts of bloggers belonging to different professional groups;
— maximal identification of bloggers' value orientations belonging to different professional groups.

Research on the Censor.NET blogosphere during July 2019 showed that these criteria were met by the issue of the Russian-Ukrainian war, as top-bloggers of almost all professional groups wrote on this topic. It most clearly and uniquely identifies the axiological, ideological positions of bloggers. Contextual features of the use of marked lexicon are considered by the position of events' interpretation: the pro-Ukrainian position / anti-Ukrainian position. Other aspects (social, political, anti-corruption) aren't covered in posts.

Thus, a special lexicon is selected from 400 posts of 80 top bloggers belonging to all 16 professional groups, with the following criteria:

1. lexicon on the Ukrainian side in the Russian-Ukrainian war;
2. lexicon on the Ukrainian side cited from other critical publications;
3. lexicon on the anti-Ukrainian side in the Russian-Ukrainian war;
4. lexicon on the anti-Ukrainian side cited from other critical publications.

If at the previous levels the topics of the blogosphere were investigated by quantitative parameters, then lexical-semantic analysis of posts allows us to design an axiological, world-view aspect of information interaction.

2   Related Works

2.1   Rhetoric of social network users

Exploring the rhetoric of different groups of users of social networks, such as online broadcasting feminist groups is a topical and socially important task. There is considerable blogging activity on a variety of topics: the number of videos already uploaded to YouTube is hundreds of millions. Feminist topics are widely represented in contemporary studies in the aspects of cultural studies, communication, forensics, medicine, sexology. The importance of adhering to the methodological and ethical aspects of the study of the rhetoric of feminist posts published in social networks is emphasized. Language features identified by researchers in the fields of communication,

media and culture and information technology are generalized. The ethical issues in the action of feminist research are examined [10].

The tone of the rhetoric plays a significant role in the implementation of social functions of social networks and media to establish mutual understanding and adjustment of social conflicts. The impact of the Internet on media and journalism in Northern Ireland and the development of the peace process in the region. The mainstream media was used as a site for negotiation and compromise. The peace process is also accompanied by the development of the mass Internet. The digital communities of the blogosphere and social media (Facebook and Twitter) provided important access to the public sphere. New communication technologies have increased the potential of Internet technologies and activist journalism. The blogosphere and the mainstream media have helped create a shared information space on the Internet, a new neutral space in which news can be covered and discussed [3].

2.2   Semantic content analysis of social networks

Social networks are being actively explored as a source of scientific information. To determine the potential of social networks, information resources that provide scientific communication were identified. Based on statistical indicators of coverage of services' users, the grouping and classification of social scientific networks was carried out, the functional assignment of resources and their ranking were analyzed. Comparative analysis of social networks was conducted by such indicators as satisfaction of information needs of users, establishment of scientific communication, promotion of scientific results, library and bibliographic support of scientific activity, evaluation of scientific results. The research substantiates the following conclusions: ranking of social networks by coverage of services reveals small differences of indicators; ranking these resources by frequency of mentions in the search results showed a significant variation in metrics. The Research Gate as social network for scientists holds dominant positions in both indicators [13-16].

Semantic contradictions in Wikipedia articles are explored using natural language processing techniques. Wikipedia's free text editing policy has led to issues such as trolling, vandalism due to lack of expertise. Earlier authors attempted to identify and classify article errors using quantitative methods, but ignored semantic contradictions in free encyclopedia text. This technique can be used to automatically identify existing semantic errors, as well as to make decisions on whether for inclusion or exclusion of controversies under the same topic [5].

Resources for semantic content analysis are catching the attention of media researchers. Its toolkit is based on a new method of the documentary reconstruction as a kind of scientific retrospective modelling. The peculiarity of the method of documentary reconstruction is the ability to theoretically reproduce systemic, synchronous and diachronic aspects of the realization of facts (events, phenomena, processes), logic and evolution of the formation of theories (concepts, hypotheses), appearance and construction of real objects, information about which is scattered of various documentary sources with deep retrospect and does not constitute a complete scientific knowledge at the time of the beginning of the study. Documentary reconstruction has

considerable potential for the development of scientific research, the object of which is certain local phenomena of the past: facts, personalities, theories, hypotheses [9].

The documentary reconstruction by separated publications in Polish newspapers in the 1980s and 1990s became the methodological basis for reproducing the whole concept of a new political thought by J. Gedroits. Documentary reconstruction demonstrates that in the concept of J. Gedroyc's new political thought the Ukrainian component occupies a particularly important position since it contains geopolitical, security, historical, political, territorial, cultural aspects [7].

An important aspect of semantic analysis of the blogosphere's content is to identify the level of blog content, that is, their saturation with new knowledge. The formation of new knowledge is considered as a complex and lengthy process of mastering of information from numerous documents and other sources of information, in particular from the blogosphere. Interesting knowledge sources are annotated blog postings. A search engine that combines social web content and semantic web technologies are offered. The system explores blog posts as the experience of people on specific topics and the process of knowledge generation. The system annotates publications on the selected topic in the blogosphere, processes the received information by means of semantic rules, finds new knowledge. Thus, the system enables to segregate previously unknown new facts, concepts and trends of development of science and technology from social web content [12].

Methodology for semantic content analysis of social networks is being developed. In this context, a special method of researching documentary information – axiomatic typology – is substantiated. The axiomatic typology of the blogosphere method allows us to establish a synergistic paradigm of informational interaction by the model: this author's composition of the blogosphere produces such blogger activity and such information interaction. The research is based on the following methodological approaches, which are founded on the general scientific and social communication categories: information, which allows using for the theoretical comprehension of the subject of study the general scientific category – information; semiotic, which allows us to consider social phenomena and processes through the prism of the basic category – sign; activity based on the basic activity category; systemic (structural-functional), which is based on general scientific categories system, structure, function. The axiomatic typology method is substantiated by establishing the features of the blogosphere axiomatic typology method; substantiation of the resources of the blogosphere axiomatic typology method; substantiation of the concept "synergetic paradigm of information interaction of a professional group of bloggers" as the final product of using the axiomatic typology of the blogosphere method; substantiation of the adequacy of the axiomatic typology of the blogosphere method [8].

2.3 Identification of language techniques for influencing the behavioural attitudes of social network users

Scientific research on the automated detection of irony and sarcasm in the marked text is being conducted in the direction of using hybrid models. Current analytical systems are not capable of detection of figurative language, but this problem is relevant and

interesting for areas such as the social sciences, politics, and online markets. The researchers found that the context of the utterance was as important as the lexical features for identifying irony and sarcasm. The researchers set up experiments to detect sarcasm in marked tagged text data in an automated mode and to display the actual meaning of the sentence. The accuracy of machines is defined in the aspects of call, accuracy, F-measurement and overall system accuracy. Framing technology is used to study sarcastic sentences. It is found that only the direct application of the frame model enables us to evaluate the accuracy of different hyper-parameters to tune the settings of the framework. Models that perform well in the field of image processing are successfully applied to the new field – natural language processing [11].

An important aspect of influencing behaviours of social network users is speech behaviour during communication. Trolling as a special type of speech behaviour has been investigated. Initially, trolling was used in anonymous network communication, and now it has become traditional media speech practice. Trolling is used for the self-affirmation of a polemic subject. It destroys communication. In dialogue, trolling turns out to be a non-response remark. In monologic writing, trolling reinforces the author's dominant positions. Trolling manifest itself in the use of rhetorical techniques such as roughness, a jeer, sarcasm, or a bantering, mockery over the opponent [2].

Trolling identification technologies in comments to posts on social media sites, e-newspapers and Internet forums allow identifying the harmful intent of participants in the communication interaction. Trolling messages can be provocative, offensive, or menacing. Computational modelling of trolling, which provides comment-based analysis from both the trolls' and the responders' position, is proposed. The model assumes the study of trolling in four categories: the troll's intention and his intention of disclosure, as well as the responder's interpretation of the troll's intention and her response strategy. One of the results of the modelling is the classification of trolls [1].

Active posting and blogging of university students actualise the study of the impact of online trolling on youth behaviour's changes. The phenomenon of online trolling and victimization that develops among university students is explored. By online trolling attacks were more commonly undergone those who post textual information on Facebook than by those who do not. More than 70% of university students undergo trolling. Types of online trolling have been identified: evocative trolling, malicious trolling, and pathological trolling. Among them, the most common is evocative trolling, which provokes certain feelings. The classification of victimization among university students is carried out. Identified types: identity victimization, dissemination victimization, malicious victimization, and obstruction victimization. Among them, the most common is identity victimization. Online trolling causes a predicted change in the behaviour of the affected person – a sense of inferiority. Social extraversion and depression positively predict online trolling behaviour [4].

An interesting social networking study was conducted on Clementine Ford's memoir, Fight Like a Girl, which sparked feminist conversations and public discussions about feminism. Analyzing conversations on Facebook and Twitter and reviews in Goodreads and traditional media in the context of identity politics, trolling and shaming, and the gendered nature of contemporary Internet spaces [17].

Social network studies have traditionally focused on the problems of formation and dynamics of social movement coalitions. Critical Internet research and research on the behaviour of social movement coalitions about digital media practices that deepen conflicts has been performed. A qualitative content analysis of the activists' texts was conducted. Specific digital practices that contributed to the creation of negative processes were identified: trolling discussions, creating fake profiles to infiltrate closed groups, hijacking social media accounts, and manipulating voting systems. It was illustrated that capturing internal discussions and spreading fragments of them through screenshots influences activist conflicts and is a tool of proof, persuasion, manipulation, subversive digital practice. Strategy to cope with digital subversion is developed [17].

2.4 Search engine optimization for social networks

The effectiveness of user-defined subject tagging using the software for describing and organizing blog content has been explored. There is a search engine whose software allows to identify publications on a specific topic and create tags for each of them. Blogger-defined tags are compared to tags defined by software. The results were compared for the effectiveness of retrieval. Most of the researched posts were found to contain a small number of words in each of them. The number of blogger-defined tags per post was significantly less than the number of keywords identified by the search engine. The semantic core of tags of both types was often either too wide or narrow, reducing the effectiveness of information retrieval [6].

Technologies of thematic modelling of blog and tag correlation are being developed. Tagging accuracy is considered when tagging and semantic content of blogs determines the quality of the search engine in the social communication system, and in particular on social networks. Tags have become one of the most important resources that characterize a blogger. A method for modelling the latent interest topics of a blogger is proposed. Detailed analysis of spam tags in the blogosphere was conducted. Highlighted tags – terms used in blogs on a specific topic. A scheme has been developed to determine the correlation between each tag and its target blog post. Tags with less correlation can be identified as Poor tags [18].

Thus, the analysis of scientific publications on social communication issues makes it possible to generate conclusions about the directions of scientific research:

— the tone of rhetoric plays a significant role in the realization of social functions of social networks and media to establish mutual understanding and settlement of social conflicts;
— semantic content analysis of social networks is considered as the basic methodology of information processing, which allows identifying the level of informative content of texts, to identify semantic contradictions;
— based on the tools of semantic analysis of media content, social networks, special methods of researching documentary information are developed: a method of the axiomatic typology of the blogosphere, which allows establishing correlation of bloggers' professional attitude and their publishing activity, the thematic orienta-

tion of their posts; a method of documentary reconstruction that allows the creation of comprehensive scientific knowledge of facts, theories, real objects, the information of which is scattered in various documentary sources with a deep retrospective and makes scattered fragments at the beginning of the study;

— identification and research of speech techniques of influence on behavioural positions of users of social networks focused on such phenomena as trolling, irony, sarcasm; these types of speech behaviour have become ordinary social media broadcasting; active posting, blogging of users of different social groups (feminist activists, university students) actualizes the study of the negative impact of online trolling on behaviour's changes;

— search engine optimization for social networks is considered in the context of improving tagging efficiency for describing and organizing blog content using software, developing a thematic blog and tag correlation modelling technologies.

3 Content analysis of the semantic field of the blogosphere

3.1 Lexicon on the Ukrainian side

The selected lexicon about the Ukrainian side testifies to the bloggers' understanding and perception of events in the east of Ukraine as war, aggression, annexation of Ukrainian lands. Lexical units belong to the following thematic groups:

— names of actions and processes: *active hostilities, anti-terrorist operation, ATO, Donetsk Sergei Prokofiev International Airport, fighting, fighting in the Donbass, military operations of the Armed Forces of Ukraine, retaliatory fire, heroic counterattack, capture in captivity, release, the return of Donbass, operation of united forces, OUF, the return of Crimea and Donbass, participation in anti-terrorist operation, front, front line;*

— names of the phenomena: *war, Donbass war, military aggression, martial law, volunteer activity, volunteer movement, global war, armed aggression, information front, local war, undeclared war, occupation of Crimea;*

— names of persons: *refugee, fighter, veteran, military man, military, internally displaced person, IDP, volunteer, military volunteer, dead, dead fighter, defender of Ukraine, defender of our land, countries, disabled person, foreign volunteer, migrants, wounded, disabled, soldier, warrior, conscript, Ukrainian military, Ukrainian warrior, Ukrainian hostage, combatant, war participant;*

— names of military groups: *army, troops, Ukrainian Volunteer Corps, UVC, volunteer units, Armed Forces, National Guard, anti-sabotage group, Ukrainian army;*

— *names of properties and features: patriotism of Ukrainians;*

— names of realities of information nature: *plan on Donbass, fake, fact-checking information;*

— names of locations: *Donetsk, occupied by the Russian Federation, ATO / OUF area, combat line, our territory, our positions, occupied Donbass, occupied Crimea, occupied territories, occupied regions, pro-Russian space, the territory of temporarily occupied Donbass.*

3.2 Lexicon on the anti-Ukrainian side

The ambiguity of the bloggers' position and interpretation of events in the east of Ukraine is revealed by the lexicon used in the anti-Ukrainian side:

— name of hostilities, processes: *aggression in Donbass, active hostilities, the annexation of Crimea, the invasion of Russian troops into Ukraine, sabotage, mass sabotage, subversive activity, human shield tactics, terrorist threat, terrorism act, terrorist attack;*
— names of phenomena: *autonomy of separate districts of Donetsk and Luhansk regions, SDDLO, Russian aggression against Ukraine, amnesty, hybrid war, Putin hybrid war, hybrid war of the Russian Federation against Ukraine and the whole civilized world, modernization of the Russian army, Russian aggression, Russian threat to Europe, Russian occupation, separatism;*
— names of persons: *aggressor, fighter, murderer, belligerent terrorist, green man, criminal, head of occupation administrations, collaborator, mercenary, armed fighter, occupier, pro-Russian fighter, opponent, warfighter, Russian aggressor, Russian soldier, Russian contractor, Russian propagandist, a Russian terrorist, separ, separatist, so-called Donetsk People's Republic minister, terrorist, "titushkovod";*
— the names of military groups: *the army of collaborators, gangs in the Donbass, the enemy, the airborne assault division of the Russian Federation, "otamanshchyna", the residence of the Russian, the Russian army, the invading forces of the Russian Federation, strangers, assault regiment of the Russian Federation;*
— names of realities of information nature: *criminal order, criminal order of military-political leadership, pro-Russian propaganda, profile of Russian soldier, Russian propaganda, fixation of Russian military equipment, photo proof of placement of Russian radio intelligence complex, photo proof;*
— location names: *aggressor state, aggressor country, invader neighbour;*
— names of terrorist organizations: *the self-proclaimed Lugansk People's Republic, LPR, the so-called Donetsk People's Republic, DNR;*
— names of military equipment: *Russian radar station for artillery reconnaissance and targeting, Russian radio reconnaissance complex.*

3.3 Contextual features of the use of marked lexicon

Lexicon on the Ukrainian side cited from Russian propaganda. There are no critical posts in which the lexicon with the negative colouring of the Ukrainian side is used in the confrontation in the east of Ukraine. Such lexical units are citations from Russian propaganda sources solely in a critical aspect, in the context of complete rejection of such an interpretation of events:

— names of phenomena: *internal political conflict, internal civil conflict, civil war, civil conflict, fascist regime;*
— names of military groups: *volunteer battalions of "ukrops", "lost younger brothers", "bloody junta", junta;*

─ names of persons: *white-haired, volunteer-killer, criminal, mercenary, "ukrop";*
─ location names: *"Ukropia".*

Lexicon on the anti-Ukrainian side cited by Russian propaganda. In the same negative sense, the following are the tokens borrowed from Russian propaganda regarding the realities in the occupied territory of Donbass:

─ name of the fighting, the process: *repellent of infantry fighting vehicle (IFV) of the junta;*
─ names of phenomena: *obstruction of artists, ban of online resources, books;*
─ names of terrorist organizations: *"people of Donbass", "people" power, OURS;*
─ names of persons: *militias;*
─ names of military groups: *"self-defence units" in Lugansk;*
─ names of the realities of information nature: *the Russian world;*
─ names of the locations: *"real people's republic", "liberated part of Donbass".*

The conducted content analysis makes it possible to find out the value, behaviouristic positions of the blogosphere's participants. To do this, we rank the thematic groups of marked lexical units (see Table 1).

Table 1. Distribution of marked lexical units by topic groups

Names of thematic lexical groups	Lexicon used in its direct meaning		Lexicon used in a critical context	
	Ukrainian side	Anti-Ukrainian side	Ukrainian side	Anti-Ukrainian side
Actions and processes	17	11		1
Phenomena	12	13	5	3
Persons	30	27	4	1
Military groups	9	10	4	1
Features and properties	1			
Realities of information nature	3	8		1
Terrorist organizations		2		3
Military equipment		2		
Locations		3	1	2

4 Results

4.1 Features of the use of marked lexicon by bloggers belonging to different professional groups

Marked words about the realities of the Ukrainian side are presented in all professional groups. The highest level of their use in groups: personalities, doctors, entrepreneurs, journalists, politicians (see Fig. 1).
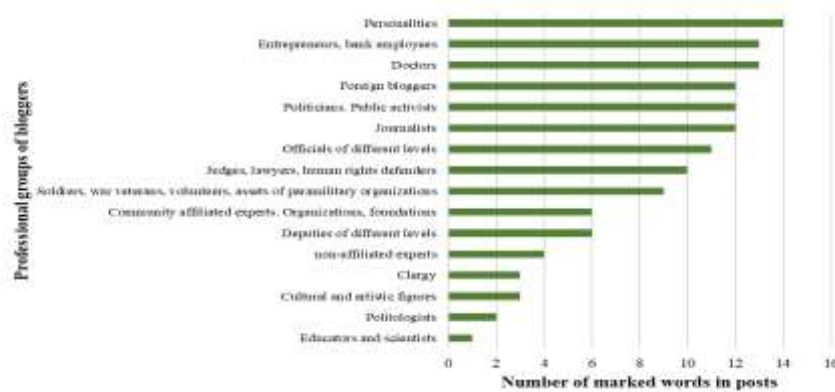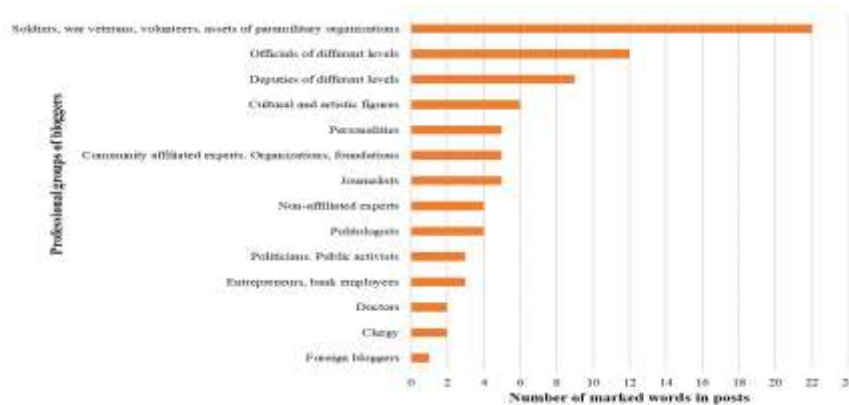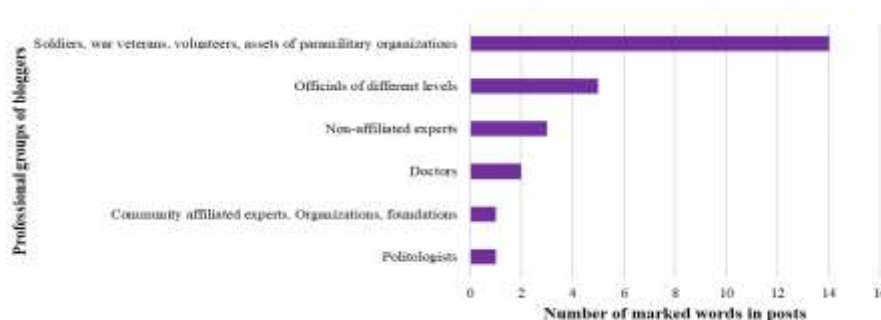

Fig. 1. Presence of marked words to indicate the realities of the Ukrainian side

Marked words to denote the anti-Ukrainian side are represented in all professional groups except judges, educators and scholars. The highest level of use of these lexemes in the following professional groups: military men, officials, deputies (see Fig. 2).

Fig. 2. Presence of marked words to indicate anti-Ukrainian side

Marked words referring to the Ukrainian side and the anti-Ukrainian side cited from Russian propaganda in a critical sense, are presented in professional groups of bloggers whose activities are directly related to the war. The highest level of use of these lexemes is in such professional groups: military men, war veterans, volunteers, assets of paramilitary organizations; different levels of government; non-affiliated experts (see Fig. 3).

Fig. 3. Presence of marked words to indicate the realities of the Ukrainian and anti-Ukrainian sides cited in a critical sense

5   Conclusion

Content analysis and lexico-semantic analysis of posts of the blogosphere Censor.NET allow to formulate the following statements:

— authors of the information resource occupy an active pro-Ukrainian position, which is indicated by both the composition of the lexicon of patriotic colour used in the direct meaning, and the composition of the lexicon cited from Russian propaganda and used in the sarcastic, critical sense;
— the Russian-Ukrainian war has deep personal roots: its nature and causes are understood in the blogger environment, which is indicated by the highest level of presentation of the marked lexicon by number and colour: names of persons – Ukrainian soldiers and their enemies, other participants of war events;
— viewpoint at the course of hostilities indicates the value, ideological nature of the confrontation, which is evidenced by the high level of use of evaluation vocabulary to designate actions, processes, phenomena, military groups; it is significant that despite the active use of various military equipment during the battles, lexicon for the designation of equipment is practically absent; compare the lexical composition of reports of military clashes in Syria and the attack by Turkish drones. In a small note of 76 words, we find terms for the designation of military equipment: drones, "swarms" of drones, airstrike, military novelty [19].

Lexical units segregated in the blogosphere posts by the 4 considered characteristics can be used to identify trolled texts. The signs of trolling texts include excessive saturation with patriotic, pathetic vocabulary, which gives rise to thinking about possible trolling. Observation: In the professional group "military men, war veterans, volunteers, assets of militarized organizations", which brings together real participants of hostilities or active paramilitary circles, the level of lexicon about the Ukrainian side occupies middle positions. The lexicon on the anti-Ukrainian side and the lexicon of the Russian propaganda texts, used in critical interpretation, are at the highest levels.

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