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THE ROLE OF DIGITAL TECHNOLOGIES IN THE ADAPTATION OF CITIZENS OF UKRAINE TO MILITARY AGGRESSION BY THE RUSSIAN FEDERATION



ABSTRACT

Introduction. During the period of military aggression and military terrorism on the part of the Russian Federation on the territory of Ukraine, digital technologies play a very important role in the timely receipt of operational information for physical survival, notifications about actual changes in the infrastructure, and communication between the state and citizens. New services have been created or existing ones adapted to military needs, which are filled with official up-to-date information, providing users with opportunities to save lives and adapt to the ever-changing military conditions. The article examines digital solutions created by the state and its representatives, which can be effective tools that complement adaptive coping strategies in the conditions of hybrid warfare.

Purpose of the article is to identify examples of applications, channels, chats and other digital solutions suitable as auxiliary tools for the application of various categories of adaptive coping strategies.

Methodology. A scientific analysis of the stress level of Ukrainian citizens during the period of military aggression by the Russian Federation and the coping strategies used by them to reduce the stress level was conducted. It is shown that for the effective use of digital solutions that save the lives of citizens during the war, a basic or average level of digital literacy is required in accordance with the digital competence testing of Digigrams, especially in the indicator "information literacy, ability to work with data". The transformation of the city's digital service during the war was considered using the Kyiv Digital application as an example.

Results. The presence of digital services available for installation on mobile devices, which are suitable for use in coping strategies focused on problem solving, and the insufficiency of the number of digital services that could become tools for supplementing coping strategies focused on emotional states were revealed. It was determined that the creation of digital services aimed at solving basic needs during the hybrid war became a forced incentive to increase the average level of digital literacy of Ukrainians. It has been found that a sufficient number of digital solutions have been developed to help citizens survive in wartime, but digital services are lacking as tools for coping strategies to balance

emotional states. The uniqueness of the Ukrainian experience of the use of digital technologies by the state in the period of hybrid warfare compared to the experience of other countries and recognition of the value of this experience at the Smart City 2022 World Congress is determined. An example of the introduction of digital solutions for the security and warning of citizens is given - the German national Cell Broadcast notification system.

Conclusions. Based on the obtained results, the need for digital services and technologies aimed at reducing the stress level of Ukrainian citizens, for their mental health and psychological assistance after psychological trauma from military operations in the country, is theoretically substantiated.



KEY WORDS

digital competence; media literacy; coping strategies; adaptation; digital technologies at war; stress; hybrid warfare



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INTRODUCTION

During the period of military aggression and military terrorism on the part of the Russian Federation on the territory of Ukraine, starting from February 24, 2022, digital technologies play a very important role

in the timely receipt of operational information for physical survival, notifications about current changes in the infrastructure and communication of the state and citizens. New services have been created or existing ones adapted to military needs, which are filled with official up-to-date information, providing users with opportunities to save lives and adapt to the ever-changing military conditions.

The population of Ukraine and citizens who went abroad for evacuation are in a state of chronic stress. To reduce it, it is possible to apply coping strategies, auxiliary tools for which can be useful digital technologies that are currently being created taking into account adaptation to military conditions.

This bitter experience is unique and valuable, important for the whole world, because the confrontation of military aggression in the form of a large-scale hybrid war in the digital age is experienced by humanity for the first time. Ukraine fought back and fought for its statehood and freedom from the invaders, and was not captured by the invaders for a few days as predicted by military experts, impressing the world community with its courage, unity and determination (Why Vladimir Putin has already lost this war, 2022). During the following months of the war, national identity was strengthened among citizens, according to sociological studies of the National Institute for Strategic Studies (How the war changed the public consciousness of Ukrainians: sociological studies, 2022).

Digital technologies, official, public and private, became the communication and information tool for this.

The article examines the latest works of Ukrainian scientists on the level of stress of Ukrainian citizens during the war and the coping strategies they choose to adapt to the situation. A. Kabantseva reports on the medical and psychological problems of Ukrainians during the hybrid war. Z. Borisova analyzes the impact of military operations on the psyche and possible ways to overcome them. To analyze the occurrence of stress in the conditions of military aggression, the transactional model of stress and its overcoming by Richard Lazarus was considered. The categories of adaptive coping strategies provided by K. Stanislavsky were considered. When analyzing citizens' digital competence, we rely on our previous research and official information from the Ministry of

Digital Transformation. Google Play and AppStore, as well as sources from municipal and national digital services, were explored to list digital solutions created by official sources as useful adaptation aids and tools in coping strategies. The details of the transformation of the Kyiv Digital municipal application were obtained from the deputy information director of the Kyiv City Council, Victoria Itskovich, during an interview at the Smart City World Congress, where the application received a special award from the expert jury.



PURPOSE

In this work, it is planned to consider how state digital technologies contribute to the survival and adaptation of Ukrainian citizens during the period of military aggression of the Russian Federation, as well as how these technologies can be used as tools for coping strategies.



METHODOLOGY

The theoretical basis of this work became the well-known psychological studies of R. Lazarus ("Psychological Stress and Coping Process") and A. Maslow ("Motivation and Personality" and "A Theory of Human Motivation"). The digital literacy framework is based on the DigComp digital competence framework (Digital Competence Framework for Citizens from the Euro Commission). To research digital solutions, the Google Play and AppStore application stores were studied, as well as state websites and the Ministry of Digital Transformation Telegram channel. An in-depth interview was also conducted with the deputy information director of the Kyiv Council.



REVIEW and DISCUSSION

1. Digital literacy of Ukrainians in the conditions of hybrid war

However, the large number of digital environments aimed at users during a large-scale hybrid war also leads to negative consequences. They are led not only by a multitude of information flows of varying quality, but also by hostile information and psychological operations, fakes, propaganda, manipulation, unverified and unconfirmed data, as well as emotional emissions of a high level of stress and tension of ordinary Internet users. Protection of the individual and society from informational pressure can be expressed in a high indicator of "information literacy, the ability to work with data", which includes such skills as viewing, searching and filtering content, critically evaluating information and checking the reliability of sources and facts (National Digital Literacy Test <https://osvita.diia.gov.ua/digigram>, 2022).

For those who have a low level of digital literacy in this area, it is necessary to rely on those official verified data that contribute to the direct protection of human life and relate to its basic need for survival: the notification of the start and cancellation of an air alarm, the functioning of the infrastructure and the power system, about the supply of products and medicines, etc.

Other aspects of the situation will be dealt with when the stress level is reduced. Otherwise, excessive informational pressure can lead to medical and psychological problems. According to the research of A. Kabantseva (Kabantseva, 2021), with a large amount of information, citizens have a sense of lack of real data, which causes many people to be uncertain about the future and fear. The results of the study showed that the majority of respondents (78%) have low awareness of

copied with acute and chronic stress, and the perception of their own physiological and spiritual needs is secondary or absent at all. As a result, symptomatic manifestations of post-traumatic stress disorder (37.4%), asthenia (27%), autonomic disorders (27%) and neurotic depression (26%) develop.

Official digital environments created by government structures, academic institutions, or officials are optimal for obtaining basic, important information to meet basic needs. Thus, consideration of other sources of information and technology, unofficial or private, is beyond the scope of this article, although it is also of interest within the scope of this topic.

2. Transactional model of stress and its overcoming by Richard Lazarus in conditions of military aggression.

Citizens of Ukraine have been in a state of acute stress for many months. This can have long-term consequences, including at the neurobiological level, since chronic stress increases the number of processes in neurons of the amygdala (stress center) and decreases the number of processes in the prefrontal cortex, which is responsible for awareness and making healthy decisions (Arnsten AFT, 2017). Therefore, reducing the level of stress with the help of adaptive techniques acquires special importance.

Richard Lazarus' Transactional Model of Stress and Coping is one of the best-known models about the nature of stress and coping. His theory is based on the fact that the individual himself, with his assessment of what is happening, often unconsciously, gives meaning and importance to the event that concerns him or what he cares about. And after that, on the basis of this assessment, emotions arise, which are not just rational, but also a necessary aspect for survival.

Let's consider the transactional model of R. Lazarus through the prism of martial law in Ukraine. Environmental stimuli are the most stressful. In conditions of direct threat to life, the perceptual filter selects these stimuli for

the primary evaluation of the interpretation of the stressors as dangerous and life-threatening. A secondary assessment of the available resources to neutralize the threatening situation determines the lack of resources of the individual, since the cause lies outside the zone of his direct influence. This leads to stressful situations, which the person seeks to overcome with the help of coping strategies that are best for him. They can be aimed at solving the problem and changing the situation, as well as at emotional balancing to change the reaction to the situation. One of the most accessible tools for such changes can be digital technologies that can be installed on any smartphone or tablet.

As a result, the situation is reassessed, adjusted to it and trained.

Discussion.

1. A direct threat to physical existence as a forced incentive to improve the digital competence of the population

An important role in the possibility of using technological solutions in difficult life situations is played by the digital competence of citizens, both for those who are in Ukraine during the war and for those evacuated to other countries. In previous years, the state actively digitized many services and documents. The forced increase in digital competence also occurred during the period of the spread of the coronavirus in 2020-2021, when most social processes went online to continue social activities during lockdowns or quarantines.

The Ministry of Digital Transformation, created in 2019, provided great support for digitization. You can also test your own level of digital literacy and get the appropriate certificate on the Diya.Tsifrova Osvita website. National online platform for the development of digital literacy (<https://osvita.diia.gov.ua/digigram>).

Tasks of the Digigrams test are systematized according to the areas of knowledge of the European structure of digital competences DigComp 2.1. Based on the results of the test, it is possible to determine

which competencies, which are part of general digital literacy, need to be developed. Also on the platform there is the possibility of training in the form of educational series, podcasts and other formats. In 2021, the digital literacy of Ukrainians of some strata of the population was at a level that requires development (including for reasons of access to the necessary technologies), and active members of society and young people already had a high level (Ronges, 2021).

During the military aggression on the territory of Ukraine, the Ministry of Digital Transformation not only created vital services (for example, the "Airborne Alert" application), but also actively worked to improve the digital literacy of citizens. For example, on November 21-27, 2022, on the initiative of the national project Action. Digital Education, a week of digital education was held on the basis of social networks and information channels (Join the Week of Digital Education from the Ministry of Digital Education, 2022). Russia's military aggression, despite the attacks on critical infrastructure, did not stop the development of digitalization in Ukraine. Applying a creative approach to solving problems, state and public figures achieve even the opposite results, which provide the country with world innovations. Examples of this are the stable and fast Starlink satellite Internet of SpaceX, provided by Elon Musk after the Minister of Digital Transformation Ivan Fedorov appealed to him in February 2022. (What's going on with Elon Musk, SpaceX's Starlink and Ukraine? Here's what we know, 2022), a satellite of the ICEYE company, purchased for the army by the Serhiy Prytula Foundation with donations from Ukrainians (Reznikov told how the "people's satellite" has already helped on the battlefield, 2022). According to the website of the Ministry of Digital, the following goals have been set by 2024: to ensure that 100% of public services are available to citizens and businesses online, 95% of the population, social facilities and main highways have high-

speed Internet coverage, 6 million Ukrainians are involved in the digital skills development program and 10 % share of IT in the country's GDP (Ministry and Committee of Digital Transformation of Ukraine, 2022).

Thus, before the beginning of the military invasion, the population of Ukraine was prepared at the basic and intermediate levels in terms of digital competence in the areas of "Basics of computer literacy", "Communication and interaction in a digital society" and "Problem solving in a digital environment and lifelong learning" (according to the generalized structure of the framework of digital competences for citizens of Ukraine (Details on the methodology for creating the Digigram, 2022). In the conditions of increased stress of the martial law, many of those who, until February 2022, did not feel the need or desire to use digital capabilities in their goals.

2. Coping strategies, which are most pronounced among Ukrainians during the war.

Ways of adapting to stress and behavioral strategies in difficult life situations aimed at achieving emotional balance are called coping strategies (Stress: Coping With Life's Stressors, 2022). R. Lazarus in the book "Psychological stress and the process of coping with it" in 1966 described conscious strategies for coping with stress and anxiety description of conscious strategies for coping with stress and with other events that cause anxiety (Frydenberg E. Beyond Coping. Meeting goals, visions and challenges, 2002). According to his definition, stress is the discomfort experienced by a person in order to effectively respond to the challenges of the environment, given his individual perception of the insufficiency of available and available resources (Lazarus, 1991).

Coping was also studied by L. Murphy, S. Folkman, N. Haan, B. Biron and others. In 1987, R. Lazarus and S. Folkman developed a classification of coping strategies according to two main functions. The first category is

cognitive coping, focused on the problem and aimed at eliminating the stressful connection between the individual and the environment. The second category is coping, focused on emotions and aimed at managing emotional stress (Lazarus, 1987).

Currently, more than 400 different strategies are distinguished (Freire, 2020).

Each individual applies a certain set of different strategies characteristic of stressful situations.

According to studies of the impact of military operations on the psychological state of Ukrainians, indicators of their anxiety and prevailing coping strategies conducted by Z. Dubovyna and her colleagues using the Lazarus method, the majority of respondents are characterized by an excessively expressed state of anxiety. 68% of respondents showed a high level of situational anxiety, excessively worrying about the war situation and having pronounced signs of anxiety and stress. 22% of the subjects showed an average level of anxiety, having a sufficiently pronounced psychological resource for normalizing the emotional state. 10% have reduced levels of anxiety and are engaged in their usual activities. Confrontation, distancing, seeking social support, escape-avoidance, and positive reappraisal turned out to be the predominant coping strategies. The strategy of seeking social support proved to be the most pronounced among Ukrainian citizens during the war. Increased activation of social contacts, including with unfamiliar people, and social cohesion proved to be an effective and productive coping strategy for reducing the level of social and psychological tension, information exchange, emotional exchange, and talking about what is happening to them (Dubrovina, 2022).

In the period of hybrid warfare, tools for applying coping strategies can be digital technologies available on any mobile device.

3. Digital technologies as additional adaptation resources for citizens of Ukraine during the war period

Consider various official digital solutions and environments as additional resources for adaptive coping strategies. To classify strategies, we will take the integrative model of the structure of overcoming stress, dividing them into several categories (Stanisławski, 2019). Categories of coping strategies and examples of possible digital resources are given in Table 1 "Overview of coping theories and their reflection in the digital activity of the state and citizens during the period of military aggression on the territory of Ukraine".

It should also be noted that the knowledge of the population about global digital measures for the development of Ukraine in conditions of war acts as an additional resource for supporting adaptive coping strategies of citizens (Overview of measures for digital transformation and restoration of economic development of Ukraine in conditions of war, 2022).

Global digital measures for the development of Ukraine in war conditions:

- Ukraine's approach to the EU's Single Digital Market as a component of digital visa-free travel with the EU;

- The deepening of digital reforms in Ukraine as a process of society's transition to digital technologies, which concerns all spheres of social life;
- Development and growth of the IT sector;
- Creation of conditions for the attractiveness of the domestic Internet infrastructure, as well as the involvement of European projects in the support of telecom companies;
- increasing the intercontinental exchange of Internet traffic;
- Implementation of the initiative to register electronic residents through mobile applications;
- Building a Made with Bravery marketplace platform and more.

In the framework of this article, we will not consider non-adaptive popular coping strategies (splashing negativity, lack of involvement in actions, lack of involvement in thoughts, use of chemicals, social care) as dangerous for the individual and unfavorable for survival in the wartime period.

Table 1. "Overview of coping theories and their reflection in the digital activity of the state and citizens during the period of military aggression on the territory of Ukraine"

<u>Coping strategies focused on problem solving.</u> They are used to change the situation itself		
№	Category of coping strategies	Examples of possible digital solutions from official sources
1	<u>Active coping</u> : specific actions to overcome a stressor or reduce its impact	<ul style="list-style-type: none"> • App "Air Alarm" • Chatbot "isEnemy" • Application "Bachu.info" • TiKhto application • Appendices "Map of alarms of Ukraine" and "Map of alarms" • Helping the sick and injured: applications "Helsi", "TacticMedAid", "Mobile first aid" • MineFree App
2	<u>Planning</u> : thinking specifically about how to deal with stress, thinking about steps to overcome the problem	<ul style="list-style-type: none"> • "Action" application and portal • "EasyWay" application

		<ul style="list-style-type: none"> • Kyiv Digital application, Kharkiv Mayor Terekhov's telegram channel and other municipal services • "Tabletki.ua" application • Chatbot for volunteer assistance: "SaveUA" • Applications with the possibility of donations: "Diya", "United24", "Privat24" and others, for example, for the benefit of the Armed Forces or for general global goals such as "people's satellite" • Retraining or advanced training, for example, the "IT generation" project or the "Info Science Bot" chatbot, educational series of the "Diya" portal • Marketplaces "Made with bravery" and "Action. Business"
3	<u>Refusal of a competing activity:</u> Refusal of another activity to resolve a stressful situation	<ul style="list-style-type: none"> • Online volunteering, such as the IT army, teachers, professionals in the helping professions, • Chatbot for volunteer assistance: "SaveUA"
4	<u>Rest:</u> waiting for a suitable opportunity to act	<ul style="list-style-type: none"> • Applications for help and entertainment for children: "Hearty app", "Bebo" • "yeBayraktar" game • Applications for digital creativity
5	<u>Seeking social support:</u> for example, advice, financial assistance or useful information	<ul style="list-style-type: none"> • Applications "Diya.Radio" and "Diya.TV" • Lepta app • Channels and chatbots of officials or specialists in messengers or social networks

Coping strategies focused on emotion regulation.

They help to cope with the emotional response to problems

№	Category of coping strategies	Examples of possible digital solutions from official sources
1	<u>Seeking social support for emotions:</u> turning to loved ones for moral support	<ul style="list-style-type: none"> • Free help of psychologists in the conditions of war Call center #VARTOJHYTY • communication with relatives and friends by cell phone, online and in messages, also thanks to the Internet Starlink
2	<u>Positive reappraisal:</u> the ability to turn the situation around so that stressful events can be interpreted as beneficial	<ul style="list-style-type: none"> • Comments on the situation by specialists, experts and officials who have the ability to make a positive reassessment (such as military expert O. Zhdanov, adviser to the Office of the President of Ukraine O. Arestovych, etc.)
3	<u>Radical acceptance:</u> the ability to perceive the reality of a stressful situation without closing from it and without deceiving yourself	<ul style="list-style-type: none"> • Educational series "Operational help for PTSD" on the "Diya" portal • National professional line for mental health support "Lifeline Ukraine"
4	<u>Self-control:</u> Trying to monitor and control your emotions in response to stress	<ul style="list-style-type: none"> • Educational series "Working with emotional burnout" on the Diya portal
5	<u>Turning to Religion:</u> Trying to Find Comfort in Religious Practices	<ul style="list-style-type: none"> • Hotline of UOC Nadiya. Spiritual support service
6	<u>Humor:</u> trying to cope with negative emotions through laughter	<ul style="list-style-type: none"> • "Memoment" app • Entertainment channel @FunICTV

4. An example of municipal application with military experience: Kyiv Digital

The necessary solutions in the conditions of hybrid warfare are created and transformed with great speed, oriented to real problems and threats. Even a year ago, in 2021, the orientation of the global IT industry did not have military priorities. Today, the experience of Ukrainian developers and officials and their creative approach to the application of digitalization and communication is of great value to other countries.

4.1. Kyiv Digital application as a continuation of the Kyiv Smart City project.

The need for digital solutions in many spheres of people's lives, settlements and the country in general became more acute after the beginning of the military aggression of the Russian Federation in Ukraine. State-level issues are largely resolved by the Ministry of Digital Transformation (for example, with the Action. State in your pocket application). However, municipal processes are digitized in many ways thanks to local authorities. Big cities are being transformed according to the concept of a "smart city", a complex and multi-level process. Launched in peaceful conditions, after the attack on Ukraine on February 24, 2022, it acquired new, previously unplanned directions for the survival of the population.

Let's consider the role of the Kyiv Digital program in helping adaptation strategies to military reality. In 2015, the transformation of the capital of Ukraine into a "smart city" began, which involves three key changes: the creation of an effective platform for managing urban infrastructure; changes in city management - increasing transparency of administration, development of a transparent and constructive model of public-private partnership; public - first of all, the involvement of citizens in decision-making and influencing the creation of city policy (Comprehensive city target program

"Electronic capital" for 2015-2018: approved by the decision of the Kyiv City Council of July 2, 2015 No. 654/1518).

Kyiv Digital is the successor to the city initiative Kyiv Smart City (which existed in 2015-2020), a mobile application under the motto "City in your pocket", created in January 2021 and providing administrative and information services on the territory of Kyiv.

Reviews of program users, left under program accounts in various digital environments, show the positive attitude of citizens. There are also reports that some functions of the program have not yet been sufficiently developed, in particular, the payment of travel tickets for city transport (Kyiv Digital, customer feedback, 2022).

However, the development team's responses and reactions to feedback show that issues are being taken into account and corrected where possible. According to estimates left by users in the Google Play application store, the average score out of 49.2 thousand user reviews is 4.4 out of 5, which indicates a good attitude of customers to the Kyiv Digital application (Kyiv Digital Municipal Main Information and Computing Center, 2022). Also, in the App Store, the average rating was a commendable 4.7 out of 5 points (Kyiv Digital, 2022). According to reports in the official Telegram channel of Kyiv Digital, in November 2022, the application was used by more than two million users.

4.2. Special award for Kyiv Digital application at the Smart City World Congress.

The evaluation of the program at the level of world standards can be found out at professional international events. On November 15-17, 2022 in Barcelona, Kyiv Digital was presented at the Smart City Expo World Congress and nominated for the annual World Smart City Awards, which is a prestigious international competition to recognize innovative projects, ideas and strategies that make cities around the world more livable for life, sustainable and

economically viable. Among the 337 selected applications, six nominees were chosen, including this Kyiv application as part of the "smart city" concept. The honorary jury decided to award Kyiv City with a special award for strengthening sustainability and continuity of services to citizens (World Smart City Awards - 2022).

According to the description on the website of the Congress, the Kyiv administration, against the background of the Russian invasion, the city administration used flexible and sustainable digital tools to meet the needs of its citizens, providing them with vital digital solutions. Kyiv Digital, the city's smartphone application, has turned from a mobile app into a life-saving tool for citizens, and the city's Wi-Fi network has expanded its coverage area. The jury announced that, withstanding the growing pressure of the Russian siege, the Kyiv city administration is demonstrating how digital technologies are helping cities to remain resilient. And also pays special attention to public safety and a sustainable multimodal mobility system, while striving to provide 100% of administrative services online by 2030 (World Smart City Awards - 2022 Winners, 2022).

According to Ms. Victoria, until February 2022, the Kyiv Digital application was mainly for transport: buying tickets, paying for parking, and others. With the beginning of the war, there was a need for citizens to have a trusted resource that informs about what is happening in the city.

- During the war, the following features were added:
- the functionality of the alarm message, because until that moment Kyiv was not sufficiently covered with sirens. The team has developed a special interface through which the emergency service, which sets off physical sirens as an alarm, simultaneously informs citizens about it through Kyiv Digital;
- alarm cancellation functionality,

immediate threat reduction notification is required (which is especially important on days when there are multiple alarms). The information comes through the same interface as about the start of the siren;

- important life support maps with up-to-date data: pharmacies, gas stations, service stations, grocery stores, the possibility of obtaining drinking water. Small and medium-sized businesses mostly closed, but there were also those who were ready to provide their services and wanted to inform the townspeople about it. Information about this was sent by entrepreneurs themselves in response to the invitation of the development team, and this additionally stimulated the opening of points in Kyiv (even at the level of private garages).
- Air quality service, thanks to the Internet of Things network operating in the city, based on the LoRaWan protocol, which also contains information on environmental indicators
- e-democracy services: surveys, petitions,
- useful messages, for example, about the beginning and end of curfew
- We are currently working on new features, such as:
- by adding high-quality messages about the time of addressable electricity shutdown. This is a difficult task, as there are planned, unplanned, and emergency shutdowns;
- document sharing is a function of transferring copies of digital documents from the "Kyiv Digital" application for various services;
- map of heating points in conditions of winter cold and destroyed critical infrastructure.
- For infrastructural and digital services (for example, data centers and some

technological solutions) in accordance with the law during the war were taken abroad of Ukraine. This allows you to use data recovery (back up) in critical cases. Services work on the basis of cloud technologies, which guarantees their reliability even in the most dangerous military situations.

Personal data, as well as some services that cannot be transferred to the cloud, are stored on the territory of Ukraine. To ensure their reliability, various scenarios have been thought out, up to a complete blackout.

The first thing that distinguishes the Kyiv Digital application from other city applications is its versatility ("an application about everything and at once" according to Ms. Victoria, under the motto "the city in your pocket"): transport, documents, useful maps, digital democracy, etc.

4.3. An example of the emergence of adaptive digital mechanisms in other countries: Germany's national public service Cell Broadcast

The main uniqueness of the program compared to other smart city solutions presented at the Smart City Expo Congress is the bitter experience of military reality in the digital age. Ukraine was the first country to face the world's largest war since World War II, and the country is gaining unique experience in using digital technologies to serve its citizens on the path to victory and peace.

It should be noted that other countries in 2022 also began to develop and test digital solutions in case of military actions on their territory.

An example of this is the national warning service of Germany Cell Broadcast Cell Broadcast – der nationale Warnservice, 2022).

A nationwide alert test day was at 8th of December 2022, which also include cellular broadcasting (the public alert service that German mobile operators have installed on

their networks). The service will be launched in 2023.

The Cell Broadcast service works without installing an additional program and is also an addition to already available warning programs (NINA or Katwarn). Unlike SMS, an alert sent via broadcast reaches every device in the radio cell that is ready to receive it.

When receiving a warning message, the mobile device emits a loud warning signal. At the same time, it displays a text message, for example, a warning about a fire, an accident or a natural disaster. The text contains instructions on how to behave, as well as tips for obtaining information. The specific competent body or ministry is responsible for the content of the warning.

Scientific value / practical value. The study emphasises the urgent need, reinforced by the consequences of the long-term war in Ukraine, to create state digital services that will become useful tools for coping strategies of emotional regulation of Ukrainians. Digital services should be convenient and quickly available for use, and be based on modern psychological research and methods of coping with stress. It is planned to establish contact with the Ministry of Digital Transformation of Ukraine in order to discuss the possibility of creating such services.

Limitation of the research. The study examines digital technologies created by official sources in terms of useful functions for survival and communication. In Maslow's pyramid, these topics can be attributed to the first, second and third levels: physiological needs, safety, social connections. Issues of the credibility of ideological information or political preferences are not addressed within the scope of this article.

Another limitation of the study is that we only looked at technologies created by government agencies or officials, or commissioned by third-party firms. However, there are many applications, services and chatbots used in military settings. However, their content requires separate consideration

depending on who is conducting them and for what purpose. In some cases, the effect of interacting with them can be the opposite of reducing stress and is not suitable as an additional tool for adaptive coping strategies.



CONCLUSIONS

Many state or municipal digital solutions have been created, which are useful tools for coping strategies aimed at solving the problem and changing the situation itself.

No targeted digital solutions created by official sources were found for emotional regulation coping strategies. However, the citizens found a high level of stress and low awareness of how to deal with it. In order to reduce it with the help of digital technologies as the most accessible tool, users seek to solve the problem themselves or turn to services that are technologically convenient, but do not guarantee the support of a coping strategy. On the contrary, spontaneous communication on social networks or watching traumatic videos can increase stressful situations and lead to long-term destructive consequences. We can come to the disappointing conclusion that the creation of digital services aimed at regulating the emotions of citizens traumatized by military aggression was very useful and appropriate for the establishment of the nation's psychological homeostasis (maintaining balance and a healthy mental state).



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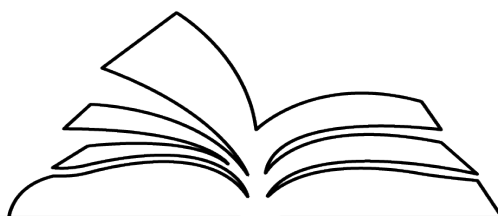
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РОЛЬ ЦИФРОВИХ ТЕХНОЛОГІЙ У АДАПТАЦІЇ ГРОМАДЯН УКРАЇНИ ДО ВІЙСЬКОВОЇ АГРЕСІЇ З БОКУ РОСІЙСЬКОЇ ФЕДЕРАЦІЇ

У період військової агресії з боку Російської Федерації на території України цифрові технології відіграють дуже важливу роль у своєчасному отриманні оперативної інформації для фізичного виживання, повідомлень про актуальні зміни в інфраструктурі та комунікації держави і громадян. Були створені нові або адаптовані наявні сервіси, які наповнюються офіційною актуальною інформацією, надаючи користувачам можливості адаптації до військових умов, що постійно змінюються.

Метою статті є визначення прикладів додатків, каналів, чатів та інших дигітальних рішень, що підходять як допоміжні інструменти для застосування різних категорій адаптивних копінг- стратегій.

Методологія. Проведено науковий аналіз рівня стресу громадян України у період військової агресії з боку Російської Федерації та копінг-стратегій, що застосовуються ними для зниження рівня стресу. Показано, що для ефективного використання цифрових рішень, які рятують громадянам життя у період війни, необхідний базовий чи середній рівень цифрової грамотності відповідно до тестування цифрової компетенції Цифрограм, особливо у показнику „інформаційна грамотність, вміння працювати з даними“. Розглянуто трансформацію міського цифрового сервісу в період війни на прикладі додатка Київ Цифровий.

Результати. Виявлено наявність дигітальних сервісів, доступних для встановлення на мобільних пристроях, які підходять для застосування в копінг-стратегіях, орієнтованих на вирішення проблеми, та недостатність кількості цифрових сервісів, які могли б стати інструментами для доповнення копінг-стратегій, орієнтованих на емоційні стани. Визначено, що створення цифрових сервісів, орієнтованих на вирішення базових потреб під час гібридної війни стало вимушеним стимулом до підвищення середнього рівня цифрової грамотності українців. Визначено унікальність українського досвіду застосування цифрових технологій державою в період гібридної війни порівняно з досвідом інших країн та визнання цінності цього досвіду на Світовому Конгресі Smart City 2022. Наведено приклад запровадження цифрових рішень для безпеки та попередження громадян – німецька національна система оповіщення Cell Broadcast.

Перспективи подальших досліджень. На основі отриманих результатів теоретично обґрунтована необхідність цифрових сервісів та технологій, орієнтованих на зниження рівня стресу громадян України, для ментального здоров'я та психологічної допомоги їм після психологічної травми від воєнних дій у країні.

Keywords:

цифрова компетентність; медіаграмотність; копінг-стратегії; адаптація; цифрові технології на війні; стрес; гібридна війна