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Digital applications as tools for psychological adaptation of citizens to changes

Olena Ronzhes*

Master of Psychology, Master of Economics, Postgraduate Student
V. N. Karazin Kharkiv National University
61022, 4 Svobody Sq., Kharkiv, Ukraine
<https://orcid.org/0000-0003-3260-8996>

Abstract. Due to the military aggression of the Russian Federation in Ukraine, citizens experience acute stress, other mental and emotional burdens, and mental disorders. Digital technologies can serve as a tool to improve mental health and psychological support for citizens, especially for those who have limited access to direct contact with a psychotherapist, by developing applications for psychological adaptation and maintaining mental balance. The purpose of the study is to determine the availability and optimal content of mobile applications for the mental health and psychological balance of Ukrainians. A search and analysis of existing solutions in the category of E-MentalHealth (digital services for mental health) in Ukraine and other countries was conducted. An empirical study of their features was conducted, and a proposal for optimal content for mobile applications as auxiliary tools for working with a psychotherapist specialist or for providing psychological assistance to citizens during martial law was formed. To assess the need for such applications, a survey, "My psychological state in the evacuation", was conducted among respondents outside the country. The online questionnaire "Ukrainians and digital services" was used to determine the most important features among the list of formed offers for optimal application content. It was attended mainly by young people who remained in the country during the military aggression. The results confirmed the need for mobile applications for mental health and psychological assistance among Ukrainian citizens, including those who stayed in the country during the war and those who were evacuated to other countries. Recommendations are given for mandatory features that can be considered technical requirements for developing or improving a multifunctional application in the category of E-Mental-Health

Keywords: digital competence; adaptation; stress; media literacy; psychological assistance applications; E-Mental-Health; digital technologies in military conflict; digital society

INTRODUCTION

Humanity, including the citizens of Ukraine, is facing substantial challenges and social crises, which negatively impact people's psychological well-being. The spread of the coronavirus in 2020-2021 exacerbated psychological issues in many citizens worldwide, leading to increased rates of depression and contributing to the adoption of digital technologies in many countries (Sorkin *et al.*, 2021). According to data from App Stores and Google Stores, during the pandemic, downloads

of mental health apps increased by 30% (NAKO Health Study..., 2020). In 2022, the world experienced military conflicts and natural disasters, notably the military aggression of the Russian Federation in Ukraine and the threat of nuclear war, further increasing the prevalence of mental health disorders globally. Victims of the war, enduring prolonged periods of acute stress in Ukraine and during evacuation in other countries, especially require psychological support and specialist

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*Corresponding author

intervention (Buzarov, 2023). Nevertheless, as demonstrated by prior studies (Ronzhes, 2022), Ukraine has developed adequate high-quality state and municipal digital solutions for physical, documentary, and organisational adaptation to crisis situations, such as alarm notifications. However, there is a lack of readily accessible and user-friendly practical solutions for maintaining the mental well-being of Ukrainians.

According to a report by the specialised division of the UN children's fund UNICEF (UNICEF, n.d.), the mental health of young people worldwide was already a concern for many even before the 2020/2021 coronavirus pandemic. Since then, the trend has worsened, with one in seven individuals between the ages of 10 and 19 diagnosed with a psychological or mental disorder. Can programmes for psychological balance and mental health help in the presence of psychological problems or mental disorders? What are the pros and cons of using digital services, and what should be considered when developing or selecting a programme for balancing the psychological state?

The purpose of the study is to determine the availability and optimal content of mobile applications for the mental health and psychological balance of Ukrainian citizens. The objectives are to investigate the need for digital solutions for the mental health and psychological balance of Ukrainian citizens, analyse the availability of such solutions and the features that could be useful in digital services for Ukrainians, and provide recommendations regarding the content of digital solutions for the mental health and psychological balance of Ukrainian citizens.

The originality of the study lies in the urgent need for psychological assistance among many Ukrainians due to the crises and losses of the modern war, which necessitates the use of information technologies as an effective tool to aid psychologists and psychotherapists. However, existing applications from other countries are geared towards peacetime challenges, and their usage experience needs to be supplemented to meet current needs. The analysis of existing successful solutions, combined with features relevant to wartime conditions, provides a new perspective on the issue of digital assistants for mental health during military operations and for support in mitigating their psychological effects on Ukrainian citizens.

MATERIALS AND METHODS

To achieve the purpose, the study was divided into the following stages:

1. Digital solutions for the mental health of Ukrainians: a search and analysis of available digital solutions in the Ukrainian language for psychological assistance to citizens.

2. Global experience with E-Mental-Health applications: a search and analysis of existing mobile applications from other countries for psychological assistance to citizens.

3. The need for a Ukrainian psychological assistance application: a survey and discussions with Ukrainians in evacuation regarding their psychological state and willingness to use digital solutions for psychological assistance, with an analysis of the responses.

4. Desired features of the psychological assistance application: an online survey of Ukrainian citizens regarding the desired features of psychological assistance applications, with an analysis of the results.

5. Recommended features of the E-Mental-Health application: the development of a list of features that should be included in psychological care applications.

The following methods were used to achieve the objectives of the study and address the specified issues.

1. This paper analyses scientific literature and reviews current articles and studies on citizens' adaptation to aggression and the level of stress due to war, as presented on the Web of Science, Scopus, and Google Scholar platforms.

2. To investigate the need for digital solutions for the mental health and psychological balance of citizens, two surveys were conducted: a survey with direct real-time contact with the target audience of potential applications titled "My psychological state in the evacuation" (115 Ukrainian citizens in the federal state of North Rhine-Westphalia, Germany, in evacuation due to the military aggression of the Russian Federation in Ukraine); and the online survey "Ukrainians and digital services" (158 citizens of Ukraine under 30 years of age, three-quarters of whom are in Ukraine).

3. To analyse the successful solutions available for digital psychological assistance, a review was conducted of digital services in the mental health category presented in the Google Play and AppStore application stores and applications certified in Germany as medical services for psychotherapy. Germany was chosen because of the large number of Ukrainians who were evacuated there and the availability of mandatory medical insurance, which grants access to certified psychological care applications as required.

RESULTS AND DISCUSSION

The following results were obtained from the stages of the study.

Stage 1. Digital offers for the mental health of Ukrainians. At the first stage of the study, available digital solutions in the Ukrainian language for psychological assistance to citizens were searched for and analysed.

The psychological risks of war have shown that digital technologies are an effective tool for adapting Ukrainian citizens to military challenges (Ronzhes, 2022). Numerous applications and digital services have been developed to assist with challenges related to physical survival, document access, some official services, and other basic needs. This experience is unique in the modern digital space and is considered by other countries to develop further strategies for the development of a digital society, as noted at the Smart

City World Congress in Barcelona (Ronzhes, 2022). Furthermore, these services can act as auxiliary tools for citizens to use adaptive coping strategies.

However, mobile digital solutions for psychological support or urgent psychophysiological self-balancing in the Ukrainian language were lacking. Such opportunities are extremely necessary for people traumatised by the war in their own country, who are at risk, forced to leave the country and go to evacuation, and who experience long-term stress and fear for themselves or their loved ones. Similarly, psychological support applications can help form a picture of one's future (Van Assche *et al.*, 2022) and motivation for survival and adaptation, which many Ukrainians currently lack. The following potential applications of digital solutions in the category of mental health for Ukrainian citizens are outlined below.

At the start of the full-scale military aggression by the Russian Federation in Ukraine, starting from the end of February 2022, psychological support to help people cope with the challenges and losses of war was primarily provided by volunteer specialists working individually or in groups. For example, specialists from the public organisation "La Strada-Ukraine", the Mental Health Care Service of the charitable foundation "Right to Defense", the all-Ukrainian hotline Lifeline Ukraine and the National Psychological Association provided free assistance to those who are in a state of acute stress during the war (Uretii, 2022).

No specific digital solutions for mental health were offered. Initially, efforts in the IT industry were focused on developing digital solutions to ensure citizen survival, such as alert messages about danger and potential harm. Volunteer specialists utilised existing digital services like online conference applications and mes-

saging platforms to offer psychological support in the early months. In April 2023, a study was conducted on digital mental health offerings for Ukrainians, the findings of which are detailed below.

On the National online platform for the development of digital literacy, "Action, Digital Education", two educational series were found that can also be added to our topic: the course series "Being close: a course on the basics of psychological support for educators and everyone who works with children" and the series "Psychological support for oneself and loved ones for civilians". These series are designed for individual learning.

Several digital resources were identified, including the Spokiy application (an initiative of a private IT company), the Psychological Support Service of Ukrainians (a union of specialists), and an educational series on psychological help and support (available on the national platform Diya. Digital Education of the Ministry of Digital Transformation). While each solution has unique features, they are not well-known among the target audience. For instance, none of the respondents were aware of these three digital mental health support options, indicating a lack of citizen awareness initiatives. This indicates an insufficient number of measures to inform citizens.

The Spokiy application, available for free download on smartphones, was developed for Ukrainians by the Lviv IT company Nerd zLab (Fig. 1). Its creators describe it as an application for meditation and psychological well-being. The company developed the application on its own initiative even before the war and later made it widely available. According to its description, the application offers features to learn meditation, overcome fear, reduce anxiety, and schedule appointments with specialist psychologists for free.



Figure 1. The Spokiy ("Calm") application by the IT company Nerd zLab

Note: screenshots of the application, taken in April 2023, with the interface and features relevant at that time

The Spokiy application led to the discovery of a psychological support service (Service of psychological support..., n.d.) for Ukrainians. This service, as stated on

its website, is a community of professional psychologists, psychotherapists, and teachers who have come together to assist all residents of Ukraine in need of

psychological support. More than 80 specialists provide free psychological help in crisis situations.

A follow-up study on digital solutions for Ukrainian citizens was conducted to gather relevant information for this study. As of August 2023, there is an urgent need for psychological and psychotherapeutic assistance for citizens at the state level due to the consequences of full-scale military aggression by the Russian Federation, which began in February 2022. Many different initiatives and educational programmes for psychologists have been launched.

The all-Ukrainian mental health programme, supported by the European Commission and other international organisations, is actively promoted by the first lady of Ukraine, Olena Zelenska, the wife of President Volodymyr Zelensky (Mental health, 2023). The programme includes specialist training, the creation of educational content for self-help and psychological education of citizens, and the establishment of regional psychiatric health centres as part of a joint project of the Ministry of Health and the World Bank.

Stage 2. World experience with E-Mental-Health applications. In the second stage of the study, an analysis of existing digital solutions from other

countries for psychological assistance to citizens was conducted. Using a search in the Google Play and App Store online application stores, applications from the categories of mental health, mindfulness, and relaxation with the highest number of downloads and the highest-rated reviews were selected for analysis. 18 apps were analysed, including Selfapy, Novego, iFightDepression, Mindshine, Reflectly, VOS, Rootd, Calm, Headspace, BetterHelp, Moodnotes, Sanvello, Happify, Talkspace, 7 Cups, Youper, Woebot, and Spokiy. Figure 2 provides screenshots of some of the specified applications. All apps, except Spokiy, were developed in other countries, and only the VOS application offers Ukrainian among its available languages, but the semantic features indicate that it is merely a machine translation, lacking the nuances of a living language. This diminishes the level of trust and empathy that the applications aim to simulate. This further emphasises the need for the Ukrainian version or the main language. Among the examined applications, six have been Russified, making them more understandable for Ukrainians compared to other foreign languages, but this does not meet the modern needs of the state.

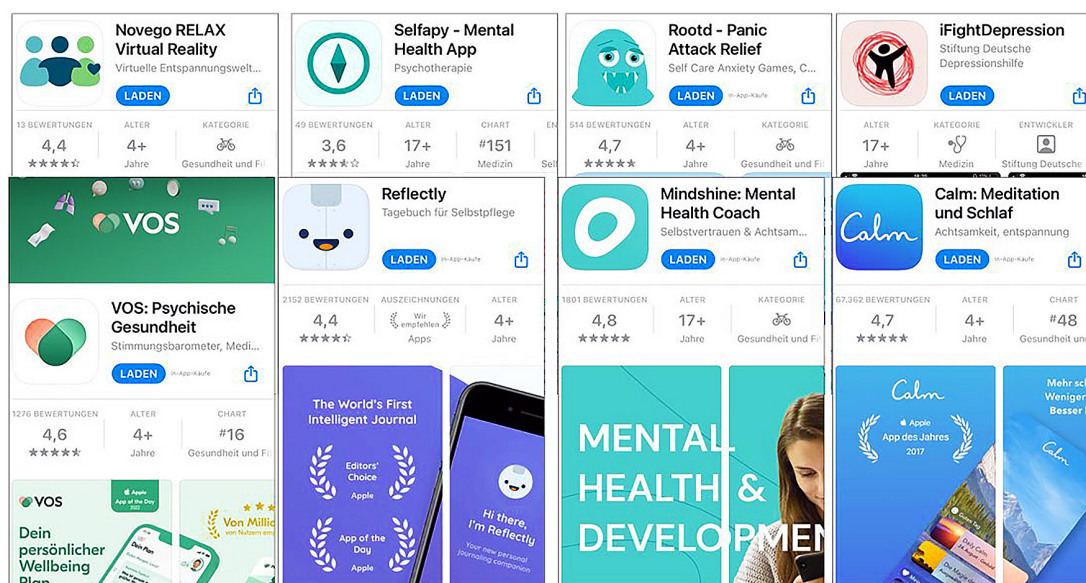


Figure 2. Examples of applications from the categories of mental health, mindfulness, and relaxation

Note: Google Play and App Store mental health applications with the most downloads and highest-rated reviews

Such digital solutions among applications belong to the E-Mental-Health category. This term refers to all digital offerings related to mental health. These include online therapy, health and psychology websites, and applications for installation on smartphones or tablets (Fig. 3). In Germany, for example, some programmes in the E-Mental-Health category are tested or certified by the Federal Institute for Pharmaceuticals and Medical Devices (Bundesinstitut für Arzneimittel und Medizinprodukte) (Digital Health Applications..., 2023). They

belong to the DiGA category (Digitale Gesundheit Anwendung – Digital Health Applications). These applications are paid for, but insurance companies may cover the cost of the appropriate diagnosis. Examples include Selfapy, deprexis, and novego. There are also freely available applications that explain various mental phenomena and situations, offer various exercises, allow one to keep a diary of one's conditions, find specialists for therapy, and contact one's psychotherapist. For example, Moodgym or iFightDepression applications.

E-Mental-Health =

all digital offers on the topic of mental health

- **online therapy**
- **sites on health and psychology**
- **programs and applications to install on a smartphone, tablet or smart watch**

**access**

- free with free access
- paid with free access
- paid according to the prescription of a psychotherapist
- by prescription, paid by the medical insurance company

format

- certified as medical devices
- psychological information
- relaxation and psychophysiological exercises
- the interface between the person and the psychotherapist
- psychophysiology

Figure 3. Classification of E-Mental-Health offers

The main advantage of digital solutions is that a person can get help before it is too late. Getting professional support immediately after recognising the need is not always possible in face-to-face meetings. For instance, in Germany, according to studies, the waiting time for therapy averages six months due to specialists' busy schedules (NAKO Health Study..., 2020). The application can offer initial self-help steps, such as during a panic attack, and provide contact details for an on-call specialist therapist.

In such cases, turning to digital programmes can serve as a temporary solution before seeking a specialist and a preventive measure to prevent situations from worsening. In some European countries, psychotherapy care programmes are prescribed by doctors and may be covered by health insurance (Jacobi *et al.*, 2016). Furthermore, not everyone who needs psychological help requires intensive work with a specialist. In some cases, individuals only need to listen to a lecture on a concerning topic, perform certain psychophysiological exercises, or receive information to correct their condition. Digital services are well suited for these purposes.

Another advantage of digital solutions for maintaining psychological balance is the relatively simple and quick access they provide. They can be downloaded to smartphones from application stores, are easy to use, and are available whenever needed. Moreover, these solutions can assist individuals in taking the initial step towards addressing their mental health. This is particularly beneficial for those who, due to various reasons, refrain from seeking help from traditional psychologists or psychotherapists. Such individuals may feel ashamed, fearful of opening up, or uncertain about whom to approach for assistance despite their need. For some individuals, confiding in an electronic device and sharing their problems feels easier, as they fear receiving negative judgment or facing bias from a live specialist.

One drawback of psychotherapeutic digital solutions can be the risk of incorrect diagnosis or problem definition. Identifying the cause or diagnosis is the

initial step in therapy for both physical and psychological issues. If an application diagnoses or labels a problem, it does so based on user-provided data, which may be intentionally or unintentionally distorted, presented incorrectly, or incomplete. Furthermore, applications are software, not live professionals with years of experience, empathy, and expertise in a personalised approach. Receiving a diagnosis from an application could shock or confuse a person, potentially worsening their negative state. In such sensitive matters, trusting a live expert is often more appropriate.

Another drawback of digital solutions is the lack of empathy, personal connection, and live communication with a psychologist or therapist, which many consider essential in addressing their mental health issues. Without face-to-face contact with a trusted specialist, the ability to observe a person's non-verbal and extra-linguistic cues, which convey crucial information when working with mental states, is lost. While a digital device can record certain psychophysiological indicators (e.g., stress levels, blood pressure, blood oxygen saturation) even better than a human specialist, it cannot replace the comprehensive analysis of the overall condition. An application cannot provide feedback, empathetic support, or establish a general informational and emotional connection, which are often crucial for successful therapy, given that humans are social beings. When selecting a therapist, personal sympathy and trust in the specialist are crucial factors a digital solution cannot replicate.

An important benefit of applications is their ability to assume certain therapist functions or enhance them with routine tasks, such as reminding users about exercises, providing information, guiding meditation or affirmations, assigning tasks, prompting diary entries, monitoring stress levels, and assisting with relaxation techniques (Bühning, 2016). This provides a supportive effect in parallel with the therapy and helps to maintain the condition at the desired level. A therapist's work with a single client at this level may be challenging or unfeasible. Similarly, the outcomes of using an application or device independently can be valuable when collaborating with a psychologist or therapist. This is evident in tasks such as analysing changes in psychophysiological states, reviewing creative outputs, or examining diary entries. This can significantly increase the effectiveness of therapy and warn of pre-depressive states (Jacobi *et al.*, 2016).

A substantial disadvantage of using digital solutions for psychological balance may be the data protection issue (Zhang *et al.*, 2022). The disclosure of highly personal data, such as mental states or responses to specific stimuli and situations, including personal records like diaries, to outsiders or attackers, can lead to various harms, such as publishing personal information or exploitation. Therefore, the reliability of personal data protection plays a big role when choosing or

creating a programme. This can be ensured either by specialised institutes or by application creators with a proven reputation and certification. Alternatively, a digital solution can be designed in a way that all personal and intimate information remains with the owner. For example, using a reminder to keep a diary in a physical notebook instead of writing in an application, thus avoiding the creation of a digital trail, or demonstrating a relaxation exercise without tracking and recording a person's psychophysiological data. The advantages and disadvantages of digital applications for psychological care given above are presented in Figure 4.

Features of digital solutions

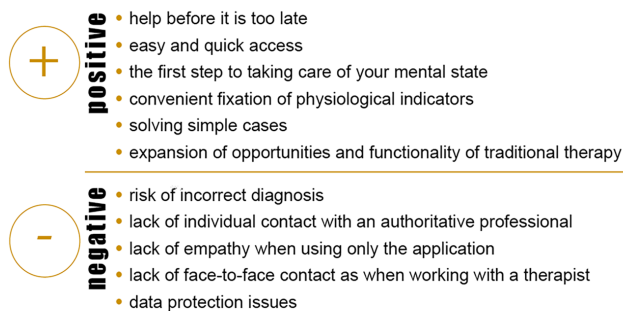


Figure 4. Advantages and disadvantages of E-Mental-Health offers

Stage 3. The need for a Ukrainian psychological assistance applications. The third stage of the study involved a survey and conversations with Ukrainians in evacuation regarding their psychological state and readiness to use digital applications for psychological help. Part of the results from the survey “My psychological state in evacuation”, relevant to this study, is presented in Table 1 “The need for a digital application of psychological help”. According to the survey of 115 respondents aged 17 to 60 who were evacuated to the federal state of North Rhine-Westphalia in Germany, 94% of respondents felt the need for a readily available application for psychological help. 75% noted that it should be an application created specifically for citizens of Ukraine, considering certain current specific features that distinguish Ukrainians from other people (current context). 48% of respondents emphasised the need for the possibility of working with a live specialist in addition to or without a digital solution. 23% are not ready to work with a psychologist, and two-thirds of them noted the presence of psychological problems. One-third of those who deny the possibility of turning to a specialist consider their psychological condition satisfactory. 35% of respondents would like to use a mental health application for self-knowledge or support of their condition.

Table 1. The need for digital applications for psychological assistance

No.	Question	Number of “Yes” responses	Number of “No” responses	Not specified
1	Do you need a quick-access psychological help application?	108	3	4
2	Should it be an application created purposefully for citizens of Ukraine, considering the current context?	86	20	9
3	Would you like the option to work with a live specialist alongside or independently of a digital solution?	55	23	37
4	Are you ready to work with a psychologist?	62	27	26
5	Would you like to use a mental health application for self-knowledge or support?	41	21	52

Note: a portion of the findings from the direct survey “My psychological state in evacuation”, involving 115 Ukrainian citizens currently evacuated in the federal state of North Rhine-Westphalia, Germany, due to the military aggression of the Russian Federation in Ukraine

Source: prepared by the author based on the obtained research data

It should be noted that 94% of respondents confirmed the need to create a psychological help application for Ukrainians, but 23% of respondents are not ready to contact a live psychologist. Therefore, such applications can become a first step or a full-fledged help (depending on the case) for those who need psychological help but have barriers or prerequisites for contacting a psychotherapist. The circumstances and reasons for the presence of such barriers were not considered in this study.

Moreover, many Ukrainians are currently in other countries as a result of the evacuation, which also adds to the mental burden due to the need to adapt to other rules in a different language. Not everyone has

the opportunity to contact specialists, and not everyone has sufficiently high-quality Internet access for online consultations. Therefore, an application downloaded to a mobile device can be an effective solution for psychological support in such circumstances.

Stage 4. Desired capabilities of the psychological assistance application. The fourth stage of the study consisted of an online survey of Ukrainian citizens regarding the desired features of psychological help applications and an analysis of the results. 158 citizens of Ukraine participated in this survey (Fig. 5), with 68.4% being women. 80% of the participants were young people aged 16 to 30, three-quarters of whom are

currently in Ukraine. They expressed readiness to use applications for mental and emotional health designed for citizens of their country. More than half of the respondents (55.1%) emphasised the need to prevent the transmission of any of their private data or sensitive content.

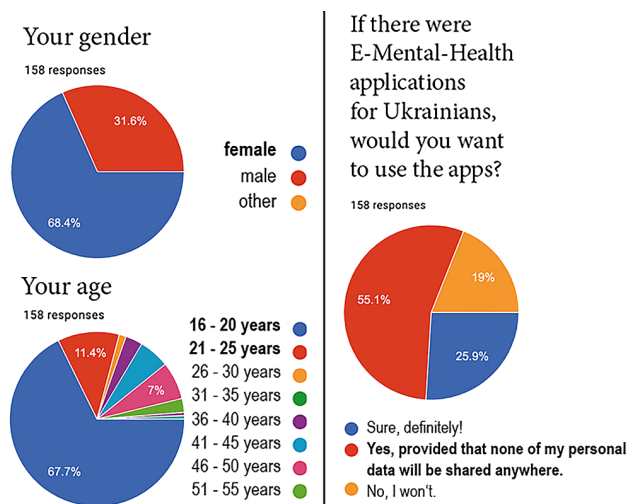


Figure 5. Respondents of the questionnaire “Ukrainians and digital services” and their need for the psychological support application

Note: on the infographic, the largest number of respondents' answers to the given questions is indicated in bold

The respondents were asked to mark what exactly should be in the psychological assistance application for Ukrainians, choosing or omitting sixteen possible features one by one. The proposed features were selected based on an analysis of the most common

foreign applications for psychological support and mental health, a literature review, and recommendations from the German Federal Institute for Pharmaceuticals and Medical Devices (Bundesinstitut für Arzneimittel und Medizinprodukte) (Digital Health Applications..., 2023). These functions are designed to be beneficial both during military crises and in peacetime, helping to prevent mental overload and develop psychological awareness:

- ◆ psychophysiological measurements and analysis of these indicators;
- ◆ guided meditations for different themes and situations;
- ◆ psychological educational materials;
- ◆ testing (psychological assessment);
- ◆ art therapy;
- ◆ journaling;
- ◆ tracking and monitoring of emotional state;
- ◆ the option to connect with a psychologist or psychotherapist for online therapy sessions;
- ◆ self-help: exercises for emergency help during acute stress or a panic attack;
- ◆ affirmations (positive statements to tune into specific moods and thoughts);
- ◆ determination of a possible diagnosis;
- ◆ the possibility to ask questions (such as a chat with specialists);
- ◆ crisis intervention: hotline contacts, emergency contacts, or referrals to local mental health services in case of emergency or crisis situations;
- ◆ progress tracking and goal-setting;
- ◆ peer support and online contacts with them;
- ◆ an exclusively Ukrainian context: appeals aimed specifically at Ukrainian mentality and experience.

The answers are demonstrated in the infographic in Figure 6.

What specifically should be included in the application of E-Mental-Health for psychological assistance for Ukrainians?

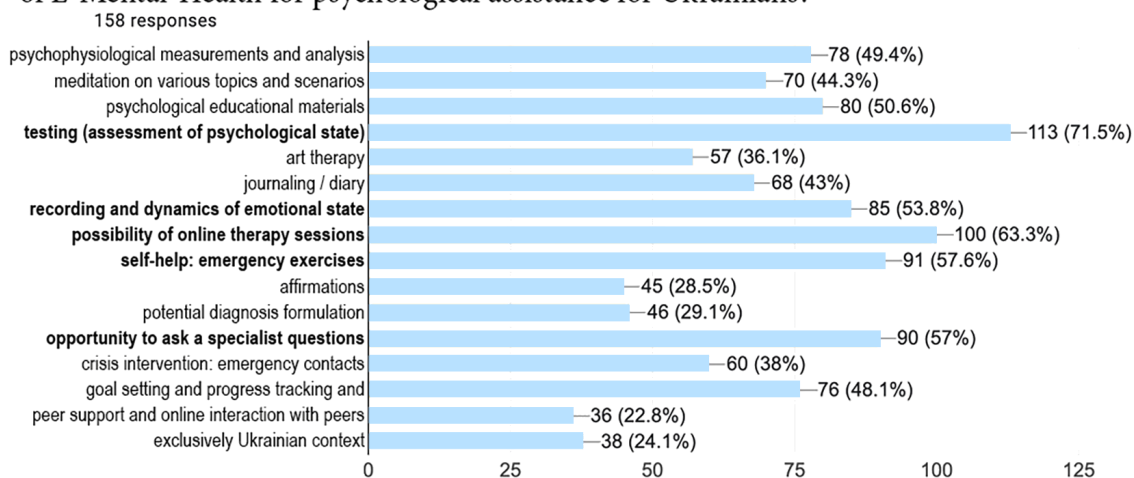


Figure 6. The selection of respondents to an online survey regarding mandatory features in the psychological support application for Ukrainians

Note: on the infographic, the five most important features according to respondents are indicated in bold

It is worth noting that at least 36% of the proposed features were selected as necessary, which allows recommending each one for inclusion in psychological support applications. The feature “Testing (assessment of psychological state)” received the most votes (it was chosen by 71.5% of respondents).

Furthermore, the top five most requested features were “The possibility of communication with a specialist psychologist or psychotherapist (online therapy sessions)” (57%), “Self-help: exercises for emergency aid during acute stress or a panic attack (57.6%), “The possibility to ask questions (like a chat with specialists)” (57%), and “Tracking and monitoring of emotional state” (53.8%).

These results suggest that such a choice is likely due to the state of crisis and post-traumatic stress disorder of the study participants, which is characteristic of most citizens of Ukraine in the aftermath of the war. The feature “Support of peers and online contacts with them” received the lowest number of votes (22.8%, followed by “Exclusively Ukrainian context” (24.1%).

This is probably because there is a satisfactory level of communication among Ukrainians, both within the country and in diasporas, facilitated by messengers and other modern technologies.

Stage 5. Recommended features of the E-Mental-Health application. In the fifth stage of the study, a list of features that should be included in the psychological assistance applications was created (Weibelhorst *et al.*, 2020). The recommendations were made considering the results of the previous stages of the study and current trends in the adaptation of citizens evacuating to the European Union (Romanova *et al.*, 2022) and staying in Ukraine.

Below are possible features of digital services for mental health, drawn from the global digital community's experience and a review of professional literature (Burger *et al.*, 2020), particularly in the use of the most prevalent applications in this field. It is essential to highlight the topics and features that are sensible to incorporate into mental health applications, as proposed in this study and detailed in Figure 7.



Figure 7. Recommended features of the E-Mental-Health application

The following topics and services can be included in the category of electronic mental health programmes:

1. Mental health assessment: The application can offer users tools to evaluate their mental health, which may include questionnaires to assess well-being or various mental health conditions such as depression, anxiety, or post-traumatic stress disorder.

2. Self-help: The application may offer self-help exercises or activities, including psychoeducation, self-directed cognitive behavioural therapy (CBT), mindfulness exercises, relaxation techniques, and stress management strategies.

3. Mood tracking and monitoring: The application can allow users to track and monitor their mood over time, providing information about their emotional well-being and identifying patterns or triggers for mood swings.

4. Virtual therapy sessions: The application may offer virtual therapy sessions, including one-on-one counselling

or group therapy, conducted via video call or chat with licensed mental health professionals.

5. Peer support and online messages: The application can provide these opportunities for people who want to connect with others or may be experiencing similar mental health issues and need a sense of belonging and support from communities.

6. Crisis intervention and emergency resources: The application may provide crisis intervention services, including hotline numbers, emergency contacts, and links to local mental health services, in case of emergency or crisis situations.

7. Educational and informational resources: The application can contain psychological research and information about various mental health conditions, coping strategies, and self-help techniques.

8. Personalised recommendations: The application may offer personalised mental health recommendations based on user-reported symptoms, preferences, and needs.

9. Progress tracking and goal setting: The application allows users to work towards mental health-related goals, which increases motivation and accountability.

10. Feedback mechanism: The application could include a mechanism which allows users to provide information, suggestions and feedback about the content, usability, and effectiveness of the application to continuously improve its features.

11. Tools for self-reflection and self-analysis: the application should offer the possibility of journaling in various forms, for example, verbal, audio recording, visual (photos or drawings), and metaphorical. These options must maintain confidentiality, with careful consideration given to data storage, whether on the device, servers, or solely as instructions without a digital trace. Creating a mental health application targeting Ukrainians requires considering several features of the contemporary Ukrainian context (Botvyn *et al.*, 2022) to ensure its effectiveness.

Localisation: the application must be localised in the Ukrainian language, with culturally relevant content and links relevant to Ukrainians. This includes using language, cultural nuances, and examples that resonate with the Ukrainian population.

Accessibility: The application should be developed considering the various needs and accessibility requirements of Ukrainians, including those with visual, hearing, or motor impairments. Given the aftermath of war, including numerous injuries, wounds, and disabilities, these criteria are particularly crucial. This can include features such as text-to-speech, large font options, and easy-to-navigate interfaces to ensure inclusivity and usability for all users.

Authentic content: the programme should provide content specifically tailored to the needs and mental health issues Ukrainians face. This may include information about common mental health conditions in Ukraine, cultural factors affecting mental health, and specific resources and services available in Ukraine to support mental health.

Local resources: the application should provide information about local mental health resources in Ukraine, psychiatric clinics, therapists, support groups, and crisis hotlines to connect users with professional support as needed.

User privacy and data security: The application must prioritise user privacy and data security, including clear instructions on how user data is collected, used, and stored. It is necessary to ensure compliance with the relevant rules and laws on data protection in Ukraine. This requirement is one of the most important when it comes to sensitive content (for example, diaries or other confidential data).

User engagement and tracking: The application should include features that promote consistent interaction with this specific user group and monitor their mental health progress.

It is important to involve mental health professionals, stakeholders, and potential users from Ukraine in the development and testing stages to ensure the application is relevant, effective, and culturally acceptable to the Ukrainian population. The integration of logotherapy methods (Sun *et al.*, 2022), existential therapy (Bland, 2022), and art therapy (Shukla *et al.*, 2022) can significantly enhance the content of digital mental health solutions, along with facilitating communication with specialists in these fields. During the interview at the third stage of the survey, 65% of the answers were received, where the search or transformation of meanings and value systems played an important role. It can also be advised to consider using art therapy methods, which enable gentle yet profound exploration through creative processes and methods. It is important to note that both Viktor Frankl's logotherapy and art therapy demonstrated their effectiveness in addressing mental and psychophysiological disorders arising from crises during and after World War II (Bushkin *et al.*, 2021). This experience, which is also connected to wartime, can be adapted for working with Ukrainian citizens and further refined for use with digital tools, considering the recommendations above. This will allow reaching more customers and patients than by using conventional technologies only. Art therapy is a widely used method among psychologists and psychotherapists in Ukraine (Ivzhenko *et al.*, 2022), as evidenced by the significant participation of specialists in events like the "Art-Practice" festivals and training programmes organised by educational institutions such as "Osnova" ("Osnova" – the international training...n.d.) and the Institute of Developmental Psychology MAXimum (n.d.). The attendance of various training programmes further supports this and events focused on art therapy conducted by different teachers and educational organisations. Logotherapy did not have an official representation in Ukraine until 2023. However, at the beginning of that year, the Logotherapy Association initiated online training for Ukrainian specialists and translated materials into Ukrainian (Ukrainian association of logotherapy..., n.d.).

This study proposed to investigate the effectiveness of using digital tools from the E-Mental Health category for teenagers and young people in Ukraine. Based on professional research findings (Robinson *et al.*, 2016) and the widespread use of digital technologies by young people, coupled with the presence of Ukrainian children and adolescents outside Ukraine due to the evacuations of 2022-2023, the demand for such tools and their benefits at both individual and state levels can be significant.

Further research and re-analysis of the study are encouraged by experts due to the variability and dynamism of the digital landscape (Aly, 2020), along with rapid political and social transformations (Pizhuk *et*

al., 2022), which suggest the emergence of numerous new digital services and the need for psychological assistance for citizens of Ukraine. Accordingly, the results of this study may need to be updated, supplemented, or adjusted.

CONCLUSIONS

Thus, the following conclusions can be drawn following the above-mentioned stages of the study:

1. The lack of quickly accessible applications explicitly created for Ukrainians, considering the current needs, context, and characteristics of this target group, was disclosed. One digital solution for the psychological support of citizens was found: the Spokiy application, created in Ukraine. This application allows communication with psychotherapists, meditation, and self-help tips and exercises. Other digital offers, in addition to mobile applications, from the E-Mental-Health category for citizens of Ukraine, such as the National Mental Health Program, were identified. It can be recommended to create psychological help applications as an auxiliary tool for professionals and citizens.

2. There are foreign applications of the E-Mental-Health category for psychological and psychotherapeutic assistance to users. Some programmes are available by prescription; others are in the public domain. The features and capabilities of the most popular applications from the E-Mental-Health and "Mindfulness and Relaxation" categories with the highest user ratings were analysed. Only one of the applications (VOS) has a Ukrainian-language version, which is a translation that does not correspond to the usual wording in live use. Therefore, at the time of writing this study, only one Ukrainian-language application was found – "Spokiy".

The strengths and weaknesses of applications for psychological assistance were analysed and the following conclusions were drawn.

◆ Digital solutions are readily available and can provide psychological first aid before it is too late.

◆ Applications for mental health and psychological balance are easy to use and unbiased. For individuals who require professional help but have not yet sought it, programmes can assist them in taking the initial step towards addressing their conditions.

◆ In establishing the diagnosis or the cause of the problem, programmes can be unreliable.

◆ While a digital solution cannot substitute a human expert, it can assume certain functions to assist in or facilitate access to the expert.

◆ Applications and devices enhance the potential for psychological balance between sessions with a therapist or psychologist.

◆ Safeguarding personal data concerning intimate aspects such as psychological states necessitates a very cautious approach to accessing the digital footprint.

3. The need for a Ukrainian psychological assistance application was identified through an analysis

of survey results and conversations with Ukrainians in evacuation regarding their psychological well-being and willingness to utilise digital solutions for psychological support. 75% of respondents expressed their readiness to use E-Mental-Health applications designed for Ukrainian citizens, considering the context of martial law, losses, and forced evacuation. 48% of respondents highlighted the importance of being able to consult with a live specialist, either alongside or independently of a digital solution.

4. The need of Ukrainian citizens for digital solutions for psychological balance and mental health has been established. It is noted that digital services are not a full-fledged substitute for working with a live psychotherapist but can be an auxiliary tool, taking over some activities of a specialist. An online survey of Ukrainian citizens regarding the most important features of psychological help applications revealed the desired capabilities of the application. Almost three-quarters of respondents (74.1%) indicated their willingness to use such applications. More than half of the respondents (55.1%) emphasised that they will use applications only if none of their personal data and sensitive content will be transmitted anywhere through the application.

5. Based on the analysis of common digital solutions of other countries in the mental health category and the results of two questionnaires of Ukrainian citizens regarding the desired capabilities of applications, the following recommendations are provided for E-Mental Health applications. A multi-functional digital service (application) should include the following capabilities: mental health assessment, self-help tools, mood tracking and monitoring, virtual therapy sessions, peer support and online messaging, crisis intervention and emergency resources, educational and informational materials, personalised referrals, progress tracking and goal setting, feedback mechanisms, and tools for self-reflection and self-analysis. In addition to this list of features, it is worth considering a more detailed list of possible functions as identified in the online survey conducted during the fourth stage of the study.

Based on the obtained results, it is necessary to indicate the prospects for further study on applications for the mental health of Ukrainian citizens. It is essential to create or enhance digital services to enable quick and convenient access to psychological support applications. This tool can serve as an auxiliary aid when working with psychologists or be used independently in mild cases or as a preventive measure to maintain the user's psychological well-being. Existing applications do not consider the current context and cannot fully cover the needs of Ukrainians. The findings of this study are planned to be transferred to representatives of the Ministry of Digital Transformation and the National Mental Health Program for possible use in providing psychological support for Ukrainian citizens living in Ukraine and abroad. It is also planned

to use the obtained data in the work of specialists at the Faculty of Psychology.

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CONFLICT OF INTEREST

None.

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Цифрові додатки як інструменти психологічної адаптації громадян до змін

Олена Євгенівна Ронжес

Магістр психології, магістр економіки, аспірант
Харківський національний університет імені В. Н. Каразіна
61022, пл. Свободи, 4, м. Харків, Україна
<https://orcid.org/0000-0003-3260-8996>

Анотація. Внаслідок військової агресії російської федерації на території України, громадяни переживають гострий стрес, інші ментальні й емоціональні навантаження та психічні розлади. Цифрові технології можуть служити інструментом для покращення ментального здоров'я та психологічної підтримки громадян, особливо для тих, хто має обмежений доступ до прямого контакту з психотерапевтом, шляхом розробки застосунків для психологічної адаптації та підтримки ментального балансу. Метою роботи було визначити наявність, оптимальний зміст мобільних додатків для ментального здоров'я та психологічної рівноваги українців. Здійснено пошук та аналіз наявних рішень з категорії E-MentalHealth (цифрові сервіси для ментального здоров'я) в Україні та інших країнах. Проведено емпіричне дослідження їх функцій та сформована пропозиція оптимального змісту для мобільних додатків як допоміжних інструментів для роботи з психотерапевтом-фахівцем або для психологічної допомоги громадянам під час військового стану. Для оцінки потреби у таких додатках, було проведено опитування «Мій психологічний стан в евакуації» серед респондентів, що перебувають за межами країни. Для визначення найважливіших функцій серед переліку сформованої пропозиції оптимального змісту додатку було використано онлайн-анкетування «Українці та цифрові сервіси». В ньому взяла участь переважно молодь, що залишилась в країні під час військової агресії. На підставі отриманих результатів, емпірично обґрунтовано потребу громадян України, як тих, що залишились в країні під час бойових дій, так і тих, хто перебуває в евакуації в інших державах, в мобільних застосунках для ментального здоров'я та психологічної допомоги. Надано рекомендації щодо обов'язкових функцій, які можна розглядати як технічні вимоги для розробки або вдосконалення багатофункціонального додатку в категорії E-Mental-Health

Ключові слова: цифрова компетентність; адаптація; стрес; медіаграмотність; додатки для психологічної допомоги; E-Mental-Health; цифрові технології у воєнному конфлікті; цифрове суспільство