

MENTAL HEALTH APPLICATIONS AND THEIR USE BY UNIVERSITY STUDENTS

LENKA PETRŽELKOVÁ, ANNA FROMBERGEROVÁ

Abstract: *This research focuses on the use of mobile apps to promote mental health by university students. The aim of the study is to analyse the difficulties that university students have in accessing these apps, the positive and negative aspects they perceive about the apps and the reasons that lead students to uninstall the app or not to continue using it.*

As a result, the paper analyses the difficulties leading to finding a mental health support app, perceived advantages, disadvantages and reasons for uninstalling apps from the perspective of university students. A functional outcome of this research may be a mapping of selected apps, especially those backed by Czech developers, describing how they work, the area of difficulties they address, as well as information on whether the apps are supported by evidence-based research. Another practically applicable outcome of the work is also recommendations that could be implicated in practice to help improve the services of these applications. These are suggested both by the users of the apps themselves, but also by the author of the study based on data analysis.

Keywords: *mental health, mental health application, university students, web applications, mHealth*

Introduction

As experts, we consistently endeavor to assist clients in managing their initial acute states to facilitate their calmness, grounding, and capacity to address their situation further. There are numerous techniques aimed at calming and coping with crisis states; however, in many instances, clients lack access to a professional who can guide them through challenging, crisis-driven, acute circumstances and demonstrate appropriate techniques.

One of the emerging options to "replace" a professional worker is the proliferation of applications focusing on mental health. In

the Czech Republic, mobile applications and websites are in their infancy, yet the COVID-19 pandemic has accelerated the emergence and development of these alternative aids. Currently, in the Czech Republic, there are several widely utilized applications (such as Nepanikař, Kogito, and the digital diary VOS) and websites (such as Terap.io, Opatruj.se) that focus not only on the mentioned prevention but also on calming during acute crises, meditation, and mindfulness.

"According to a survey by the World Health Organization, 29% of the total of 15,000 applications in the field of mobile health (mHealth) are focused on the diagnosis,

treatment, or support of mental health“ (Salehi et al., 2019, p. 303). The number of smartphones is constantly increasing, and digital technologies are continuously evolving. With gradual growth and development, these technologies are penetrating into increasingly more areas of our lives. Among the first professionals to strategically utilize mobile technologies in daily practice to enhance the efficiency and quality of services were healthcare providers. Electronic devices for communication, research, and education began to be utilized as early as the 1990s (Luxton et al., 2011). Since the 1990s, these technologies have undergone significant development. The progressive evolution has brought about both quantitative changes (increase in the number of smartphones, increase in the number of applications) and qualitative improvements (new, enhanced applications and systems, targeting diverse areas). One of these new areas is the field of mental health care. As evident from the aforementioned research, mental health is a significant context in which these technologies are employed (Giota & Kleftras, 2014).

The primary goal of mental health support applications is to promote mental health and well-being, whether it involves promoting a healthy lifestyle and thereby preventing mental health issues, or assisting in the treatment of established mental illnesses. The four main areas targeted by these applications are education, monitoring and assessment, intervention, and social support (Salehi et al., 2019).

In terms of targeting or functionality, applications can be divided into three main areas:

A. Stand-alone measure:

Within this category, applications are used independently. This means that the application is the sole intervention utilized by the client (i.e., it is not

accompanied by any professionals or other care). The advantage of this approach lies in the absolute freedom of the user, allowing for intervention utilization at any time and place, according to one's own schedule. Due to this high flexibility, there is an increased likelihood of user engagement with the application (intervention), as the "low investment" (both in terms of time and finances) may motivate individuals to work on themselves more actively. Moreover, this approach eliminates the issue of a shortage of professionals and their capacities. Another significant advantage, according to the authors, is the fact that certain anonymity and privacy reduce barriers and stigma, which may hinder certain groups of users from seeking a "human" professional. Thanks to all these factors, interventions in the field of mental health can reach a large number of people, which in turn may lead to a reduction in the reluctance to discuss mental health and take care of it. Thus, these factors contribute to a certain level of prevention in the field of mental health.

B. Blended concept:

This area can be translated as a "combined" or "mixed" approach. As the name suggests, it involves the simultaneous use of an application and a real professional. This concept can be utilized, for example, as a complement between individual sessions or as an extension of the professional's work. The professional can thus use the application as an assistant, such as assigning tasks to the client, monitoring the client's moods, reminding them of basic principles agreed upon, or simply providing support.

C. Stepped-care approaches:

The so-called stepped-care concept is based on the individual needs of the client. Applications are used based on

the client's state, progress, or regression. The use of applications in this approach may tend to increase. This approach is used, for example, with clients who are poorly motivated and might be deterred by intensive sessions. Conversely, decreasing the use of applications and interventions may be beneficial for clients who have already recovered or resolved their issues, and the mobile application intervention is only "maintenance" (Ebert et al., 2017).

Effectiveness

The increasing number of mobile and web applications, along with a growing user base, has also brought about a pressing issue: ensuring the quality, effectiveness, and expertise of these applications. According to a meta-analysis by Lecomte et al. in 2020, there are between 10,000 to 20,000 mobile applications focused on mental health. However, only 3-4% of them are scientifically supported. Nevertheless, as the authors point out, with the rising number of applications, there is also an increase in the number of studies dedicated to researching the effectiveness of these applications.

Advantages of Mobile and Web Applications

While the effectiveness of interventions within individual applications may vary, mobile and web interventions offer several undeniable advantages. Among these, availability, flexibility, often cost-free access, and anonymity are notable. Mobile applications allow access anytime and almost anywhere (the only limitation may be the lack of data connection, although some applications also offer offline functionality). Users can choose which day and time they will utilize the application's services. They are not tied to scheduling appointments with professionals. The application enables users to flexibly plan individual "sessions" according to their pace. The flexibility and

variability of applications also allow users to explore a vast number of applications with different theoretical backgrounds and techniques. Users are thus able to combine, alternate, and change approaches according to their own needs (Rozenal et al., 2014).

Another undeniable advantage is the elimination of any travel to professionals, which can be a barrier to receiving mental health assistance, especially in smaller towns or villages where professionals are scarce and clients often have to travel long distances to larger cities. For some users, these applications may also offer a significant benefit: cost-free access. Although some Czech health insurance companies respond to the increasing demand for psychosocial support by providing financial contributions, this financial support only partially covers the costs. Moreover, as mentioned earlier, there is a shortage of mental health professionals, and even fewer of them work on insurance plans. Therefore, it is not possible to fully meet the demand for these services. Mobile applications can thus be beneficial for clients who need some form of psychological support, face long waiting times for insurance-based professionals, and do not have the financial means to pay for professionals themselves.

Although mental health has been increasingly entering social discourse, we are still not at a stage where seeking psychological assistance is free from various prejudices and stereotypes. For some clients, meeting with a psychologist, psychotherapist, or psychiatrist, although highly necessary, may still be an insurmountable taboo. Mental health issues and considerations of seeking psychological help may be accompanied by fears of ridicule, embarrassment, or condemnation. Therefore, mobile applications can also be seen as a "bridge" between potential clients and professionals. Not only do most applications operate completely anonymously, without

anyone in the user's environment needing to know about their use, but also, due to their availability and number, they can help break down this taboo and bring clients closer to real professionals (Patel et al., 2021).

If we look at the functioning of these applications within the so-called "blended" concept, i.e., the concept of mobile and web applications as a supplement to interventions with real professionals, another undeniable advantage may be the attractiveness of applications, which can help support the client's self-work. They can provide interesting additions to individual sessions, as well as support between them. Thanks to the availability of applications, clients can record their progress between sessions, which can lead to more frequent practice of various tasks or can also be used to measure the effectiveness of interventions (Hanft-Robert et al., 2021).

Giota and Kleftras (2014) published a comprehensive analysis of the risks, disadvantages, but also ethical limits of using applications in young adults. In a chapter aptly titled "The Power of Mobile Applications: Innovations in Mental Health," they do not forget to mention some clear advantages that these applications offer in the context of use by young adults. The authors state that young people who suffer from mental disorders or are at risk of mental problems often do not seek professional help, despite the effectiveness of professional care. According to them, the reason is the lack of available care, which can be due to both financial reasons and practical reasons - travel distance to professionals, time constraints, but also the already mentioned concerns about labeling and stigma, which may accompany mental health care. They suggest that mHealth is an ideal platform for self-observation, symptom and behavioral pattern recording, based on which applications can provide

personalized feedback, maintain motivation, and provide psychotherapeutic methods. However, their purpose can also be found in effective training and exercise.

Limitations of Mobile and Web Applications
Despite the advantages mentioned, there are also many limitations and risks associated with mobile and web applications in mental health care. Firstly, we can mention the risks and limitations arising from the technology itself as a medium. Technological devices are limited by their technological parameters, such as problems with the necessity of internet connection and its stable connection, battery limitations, etc. Another significant issue is the storage and retention of users' personal data. Quality mHealth systems must be very comprehensive and holistic in their approach to the user. However, this means that they must collect as much data about the user as possible. This includes not only personal data such as name, email, or address but also sensitive personal data such as weight, height, daily routine, diet composition, sleep information, movement, social contacts, pregnancy, menstrual cycle, and so on. While higher-quality applications have various security systems to protect against data theft, no system is foolproof. Additionally, we must consider the fact that we do not always protect our mobile devices and other equipment as much as we would protect other personal belongings - we may forget our devices somewhere or they may be stolen. (Giota & Kleftras, 2014)

Another problem may be the fact that there are already a very large number of mHealth applications, and users, as well as professionals, may get lost in which of these applications can be considered "quality." Low-cost applications may be supported by third parties who may use users' personal data - it is therefore always essential to thoroughly read the terms of the application. With these applications, there may also be

a problem with frequent unwanted advertisements, which can disrupt the treatment process for users and discourage many of them. (Giota & Kleftras, 2014)

Another limitation of these applications may also be that we do not always know who is behind the application. Often, applications are created and published by people who do not have any professional qualifications. The methods and forms of work may not be verified and supported by evidence-based evidence, which in the best case may lead only to the inefficiency of interventions, and in the worst case, incorrectly chosen interventions or information provided may lead to harm to the user. Although, as mentioned earlier, comprehensive studies confirming the effectiveness of these applications are still lacking, mHealth applications and their methods and recommendations can affect a wide range of areas - work and study life, interpersonal relationships, self-esteem, etc. It is therefore always necessary to work only with verified and professional applications that can provide relevant and verified forms of help. Even if the application is verified by many studies, human contact is irreplaceable for some clients. Mobile and web applications may be entirely inappropriate for certain user groups because they cannot fully replace human relationships, contact with another person, empathetic understanding, and individualized care targeted at the specific individual.

Another risk can be seen in the limitations of applications for "older" generations, both among professionals and clients. Some of these clients and professionals may feel intimidated and threatened by these applications. This is confirmed by the research of Hanft-Robert et al. (2021). In their study, they focused on analyzing the concerns of psychiatrists regarding the use of mobile and web applications supporting mental health. From the research, which

also included psychiatrists from the Czech Republic, several limitations were identified that psychiatrists fear when working with these applications:

- Patients will be their own doctors - concerns stemming from the fact that the patient or client cannot objectively decide on important health procedures, medication, or the appropriateness of significant interventions.
- The effectiveness of the application also depends, among other things, on the established diagnosis – the established diagnosis affects the effectiveness of the application's intervention (so higher efficiency can be expected in clients with anxieties, who may be highly motivated to use the application regularly, lower, on the contrary, in clients with depression or severe psychotic disorders).
- Low individualization of treatment or responses - here, professionals point out that the intervention or treatment of each client is always determined based on the client's individual needs, which may change during the process, and the professional must respond to them flexibly.
- Fear of replacement - fear of losing the purpose of one's own actions and being replaced by technology.
- Lack of experience with mobile applications – lack of interest, concerns about applications and mobile devices, leaving these technologies to the "younger generation," sticking to one's own procedures.

Apart from mapping these risks, which are accentuated by professionals themselves, the authors of the study also mention in the discussion that fears or concerns about applications were expressed more by professionals who did not use applications in their practice, were not familiar with them, and perceived applications more as a potential threat that could replace them

rather than as useful support for their work. Education of professionals in the field of mobile technologies could help reduce concerns and fear and motivate more frequent use of these applications. This education and "redefinition" of the role of professionals in the field of mental health care are seen as one of the significant and important tasks in the new era of eHealth. Other authors suggest that mHealth applications cannot be considered a substitute for face-to-face therapies and consultations. However, they see their future as a supportive tool for these personal meetings. According to them, applications can support personal therapies and consultations by increasing the efficiency of sessions and maintaining the motivation of clients between personal meetings with professionals. Finally, they also recommend avenues for research in this area – the future and necessity of research and practice are primarily seen in the certification of mHealth applications to guarantee their quality and professionalism, in creating educational opportunities for professionals to familiarize themselves with applications and introduce them into their practice, and also appealing to professionals, especially psychologists, not to be too afraid of the increasing awareness and popularity of these applications but rather to turn to technology as helpers and help improve them through research. (Giota & Kleftras, 2014)

Introduction of Selected Mobile Applications Supporting Mental Health

Calmio

Calmio is the first Czech meditation application. The idea behind it was conceived by Tomáš Volejníček, who was inspired by foreign meditation applications, especially Headspace and Calm, in the creation of a Czech meditation application. While both of these applications are accessible to Czech users, the author was aware of both the

limitations of the language barrier (both applications are only available in English) and the different problems addressed by Czech and American society. While foreign applications focus more on the theme of performance, according to the developers of the application, Czech society is mainly troubled by reduced self-esteem, poor mood, and anxiety. The development of the application also involved psychologist and psychotherapist Markéta Jankovská and Martin Kundera, who is responsible for marketing strategies and product development. (Brejčák, 2019; Nosková, 2020)

The Calmio application lists several positive effects of regular use. These include improved sleep quality, stress relief, and strengthening of mental health. The application can be downloaded on both Android and iOS platforms. After downloading, the application requires login and then provides several essential steps for proper meditation (feeling comfortable, not forcing oneself into a position, etc.). As a meditation guide, the user can choose one of four offered voices, and then the application allows access to individual lessons. The lessons consist of three basic courses, with additional courses focused on specific themes (calm sleep, calming the mind, better concentration, kindness, fear, anger, restlessness, etc.). Lessons are unlocked gradually. Within the application, users can also access educational videos. The philosophy of the entire application is for the user to find a few minutes for themselves every day, learn to identify thoughts racing through their mind, and be able to control them when experiencing various situations. (Calmio, 2022; Mertová, 2021)

Endel

The Endel application is the result of work by the eponymous Berlin-based company of developers and artists. The application works with music, specifically personalized

melodies and compositions, which, using artificial intelligence, analyze the circadian rhythms of individual users and based on this information offer music suitable directly for the specific user. Due to the company's collaboration with Apple and their smartwatches, the artificial intelligence in the background of the application can track data, based on which it can subsequently offer the ideal personalized music playlist to the user. The monitored data that the application subsequently analyzes include, for example, heart rate throughout the day or information about the precise location of the user to determine the level of light, weather, and thus the physical activity of the users. By synthesizing these individual pieces of data, the application can establish the circadian rhythms of users, which the developers consider the basis of both mental and physical health. The application can analyze, adapt to, and gradually improve people's rhythms. The application includes several modules, including relaxation, concentration, sleep, and activity. (Endel, 2022; Hayes, 2020)

The developers of the application strive to reflect current scientific knowledge, and they have based their application on evidence-based findings. The positive influence of music on physical and psychological health has been demonstrated in their study, for example, by Knight and Rickard (2001), who examined the effect of music on the level of stress in intact men and women. They demonstrated that the effects of music reduce the subjective experience of anxiety, heart rate, and systolic blood pressure. Haruvi et al. (2022) went further in their study of the positive effects of music, examining its influence on a person's level of concentration. In their study, they divided respondents into three groups and assigned several tasks on a tablet to each of them. One group performed tasks without musical accompaniment, the second group with non-personalized music (i.e., predefined

songs from the Spotify platform), and the third group with personalized music (based on user data such as heart rate, GPS location, time of day, etc.). The authors demonstrated that the level of concentration was higher in subjects who listened to music. However, the highest level of concentration was demonstrated in respondents who listened to personalized music.

The advantages of the Endel application include its scientific background, while its disadvantages include the absence of the Czech language and the need for a subscription.

Fabulous

The Fabulous application was founded by a team from the Laboratory of Behavioral Economics at Duke University, led by Dan Ariely. As the name of the laboratory suggests, the foundation of the application is based on behavioral science. The core of the application revolves around the establishment of simple habits that gradually lead users towards a healthier lifestyle.

The application leverages fundamental insights from behavioral science, such as the use of rewards, breaking down long-term and complex goals into smaller units, and an attractive graphical interface reminiscent of a game or digital to-do list, where users can track their progress. The application begins motivating users immediately upon opening. It appreciates users for downloading the application and generates a letter addressed to the user from their future, healthier "self". In the initial days, the application focuses on the start of each day – users are prompted to drink a glass of water every morning, followed by a task to have a quality breakfast after three days. Tasks unfold gradually, and one of the driving motivational forces for users to complete tasks is curiosity about what other tasks the

application has prepared. The application supports the transformation of habits into daily rituals through simple rewards. For instance, the morning routine (drinking water, morning meditation, or walk) is subsequently rewarded with the opportunity to dance to a favorite song. After completing several tasks, users are rewarded with a certificate. The application offers numerous "small" rewards to reinforce desirable changes in user behavior.

The application offers several modules focusing on various aspects such as exercise, healthy eating, focused work, quality sleep, self-confidence, and stoic thinking. It provides users with a clear structure for each day but also allows them to create their own routines. In addition to daily tasks, the application offers weekly shared challenges available online for all community members. These challenges include, for example, a week without smoking, without social media, or monthly challenges for healthy eating. The "Make Me Fabulous" section offers 13 different thematic areas containing a variety of activities to try based on the user's specified time availability. These areas include activities such as breathwork, yoga, meditation, or sitting and contemplating. The developers are continuously working on the application, adding new modules and expanding it with new features, such as coaching libraries where users can find a plethora of validated studies and articles, the option to sit with a real coach, or share their progress within the community of other users.

A critical evaluation of the Fabulous application was conducted by medical experts on the Healthline medical website. A team of experts consisting of clinical psychologists, psychiatrists, social workers, and therapists highlighted several key advantages and disadvantages of the Fabulous application. Among the advantages

are its evidence-based background supported by the latest scientific studies, the application environment, which strongly resembles a gaming environment and is thus highly motivating and enjoyable for users, highly refined application design, graphics, and ease of use, a large number of exercises and meditations, and information on the duration of individual tasks. Experts recommend the application primarily for people with chronic fatigue, those looking to improve their sleep, increase their energy levels during the day, or enhance their concentration. The application is also recommended for people with ADHD (Attention Deficit Hyperactivity Disorders) or those suffering from anxiety. Among the main disadvantages is the almost necessary requirement for the paid version of the application (although the application can be used without a subscription, in this case, it offers many fewer options, sections, and exercises) and the inability to set goals other than daily habits. Experts also criticized the application notifications, which are subtle and users may easily overlook or ignore. Furthermore, the experts specifically focused on one of the sections related to healthy eating and weight loss, noting that weight loss may not be the goal of every user, and this section could be dangerous for some users. The application is available in several European languages, but Czech is missing from the language options. (Balagam, 2022)

Kogito

The relatively new application offered in the Czech environment is called Kogito. Its name is derived from the Latin word "cogito," which means to think. Thus, it is evident from the name that the application primarily deals with negative thoughts, aiming to identify and subsequently work with them. The theoretical basis of the application is cognitive-behavioral therapy. The application addresses psychosocial problems faced by

women related to motherhood. Therefore, it is targeted at expectant mothers or women after childbirth who experience negative thoughts associated with motherhood, helping to reduce stress and improve mood. (Kogito, 2022)

The application is supported by multidisciplinary collaboration. The idea to create an innovative application focusing on expectant mothers and women after childbirth was initiated by psychiatrist Antonín Šebela, who works at the National Institute of Mental Health (NIMH). To develop the content itself, Šebela enlisted psychiatrists and psychotherapists from NIMH. Additionally, to better understand the specific problems women face during childbirth and the postpartum period, experts and peer consultants from the non-profit organization "Úsměv mámy" (Mother's Smile), which focuses on the psychological issues of women during pregnancy and childbirth, also contributed to the application's development. (Úsměv mámy, 2020; Doležalová, 2021)

The application comprises two sections – a "diagnostic" and an intervention section. Immediately after downloading the application, the user is prompted to complete two questionnaires (referred to in the application as "Mood" and "Anxiety") along with some basic demographic information about the user. Regarding the questionnaires, they consist of two scales, the Edinburgh Postnatal Depression Scale and the Perinatal Anxiety Screening Scale. Upon completion, both depressive symptoms and anxiety symptoms are evaluated, with depressive symptoms given greater weight. The intervention part consists of relaxation exercises, elements of psychoeducational activities, meditation, mindfulness training, and elements of peer support (shared stories by women who have experienced mental health problems during pregnancy and motherhood). Similar to previous

applications, the user progresses through five levels that gradually unlock over time. In addition to the intervention options offered in the application, it also provides opportunities for monitoring one's own emotions, recording personal thoughts, and planning and completing anxiety and depression cycles. According to the authors, the application has a preventive nature - the user monitors the development of their mood over a certain period, observes their progress, and with appropriate interventions provided by the application, it can help prevent the development of more serious mental difficulties. (Šebela a kol., 2021; Doležalová, 2021)

The developers and authors of this application aimed to create an accessible and low-threshold form of psychosocial support for women during childbirth and motherhood, as according to the application's author, Šebela, the care for this client group in the Czech Republic is not systematized. They also stated that a large number of women experience psychosocial problems during pregnancy and after childbirth, which were exacerbated during the pandemic period. However, only a minimum of them seek professional help. Among the advantages of the application is undoubtedly the fact that it is offered in Czech and is available for free - thus accessible to any user who has a smartphone. The application can also assess the risk of depression and anxiety symptoms in the user, and if the scale values are too high, indicating a risk, it recommends seeking professional help from a psychologist, psychiatrist, or psychotherapist, and it also provides specific steps for arranging this assistance to facilitate it for the user. One disadvantage could be considered its very narrow user focus. However, the developers are currently working on expanding cognitive-behavioral techniques to address

other issues (such as sleep problems). (Doležalová, 2021)

My Possible Self

The journey of the My Possible Self application began in 2009. Its founder, Joanne Wilkinson, decided to create the project after her own experiences with challenging adolescence, aiming to support well-being and emotional health for the general public. In 2016, with the help of her two daughters, she implemented this project into a mobile application. Shortly thereafter, experts from Priory Health Care took notice of this application. Priory Health Care is one of the leading independent healthcare providers in the United Kingdom, focusing primarily on well-being and mental health. With the support of this company, the application can be classified among those supported by current research. (Evidence-based Application). (My Possible Self, 2022; Priory Health Experts, 2022)

Like many of the aforementioned applications, the My Possible Self application primarily draws from techniques and theories of cognitive behavioral therapy. It focuses on breaking down large problems into smaller, manageable parts. Specifically, the application works with individual problems on five levels – situations, thoughts, emotions, physical sensations, and behaviors. By recording and subsequently analyzing these factors, it aims to identify what influences the moods of users, identifies negative patterns in which users persist, and seeks to gradually transform them into positive ones. Within the application, users are also offered the option to complete an initial questionnaire, which can help them identify areas they want to focus on. The application is particularly suitable for difficulties caused by anxiety, depression, sleep problems, or excessive stress. (My Possible Self, 2022)

In addition to individual use, the My Possible Self application also offers the possibility of use in the workplace. It provides the option to monitor various components of employee well-being, analyze the resulting data, and offer suggestions for improving the work environment. With further development and collaboration with other organizations, the My Possible Self application has also been successfully implemented in the healthcare sector. In collaboration with another monitoring company (Inhealthcare), the application offers assistance in monitoring individual patients and selecting subsequent interventions. These interventions are part of a larger project called IAPT (Improving Access to Psychological Therapies), which focuses on implementing evidence-based programs and interventions for hospitalized patients. The philosophy of this program assumes that appropriately chosen interventions will help patients return to their normal lives, including the work process, more quickly, resulting in financial gains. (My Possible Self, 2022; Wakefield et al., 2021)

Upon opening the application, the user is greeted by a friendly and well-designed graphical interface with a guide named Bloop, who accompanies the user throughout the process. At the same time, the user has the option to immediately explore the offered sections. These include meditation, primarily used for calming purposes, mindfulness techniques, which serve to improve mood, relaxation, and sleep quality, as well as mood tracking and reframing negative thoughts. What sets the My Possible Self application apart is the inclusion of Mood Tags, which are related to monitoring one's own moods. These tags not only track the user's mood but also analyze the data and offer the user a range of possibilities regarding who, what, when, and how might influence their mood. Additionally, the application features Insights, which serve as a form of self-awareness,

monitoring of one's own progress, as well as motivational messages and reminders. (My Possible Self, 2022)

The application is not available in the Czech language, so Czech users may encounter issues due to the language barrier. The application offers a paid premium version; however, users can also utilize the basic version, which is free. One of the advantages of the application is undoubtedly its evidence-based background and multidisciplinary collaboration involving several organizations and experts. The application also introduces several new features and expands certain sections—it does not merely stop at monitoring the user's mood but also focuses on analyzing them. With guiding questions such as "Who are you with right now?", "How do you feel at the moment?", "Where are you right now?", and "What are you currently doing?", the application offers the opportunity for self-reflection on one's feelings, identification of personal resources, and elimination of negative situations. (My Possible Self, 2022)

Nepanikař

The application "Nepanikař" is a project initiated by three students from the Brno University of Technology: Veronika Kamenská, Aleš Řezáč, and Tomáš Chlubna. The idea behind creating the application, which assists in acute psychologically demanding situations, stems from the personal experience of the author with mental health challenges. During the development of the application, the authors collaborated with various experts, including psychiatrists, psychologists (primarily from hospitals in Brno and Břeclav), as well as other specialists from the private sector. They also partnered with the non-profit organization "Nevypust' duši," which focuses on mental health and well-being, primarily among students but also serves the broader public. However, the authors did not overlook the importance of peer

support during the development of the application, so they also involved individuals with mental health conditions in the process. (Daňková, 2019; Nevypust' duši, 2022)

The application "Nepanikař" provides first aid in more acute psychological states, such as panic attacks, acute anxiety states, depressive symptoms, or suicidal thoughts. The application consists of seven modules (Depression, Anxiety/Panic, I Want to Hurt Myself, Suicidal Thoughts, Eating Disorders, My Records, and Help Contacts). Each module contains several subsections. In the Depression module, users can record their resources ("What Can Help Me") to turn to in times of difficulty, track their achievements, pleasures, or plan activities. In the Anxiety module, users will find several useful activities or games to use during acute panic attacks or anxiety episodes (counting, balloon play, seesaw game, relaxation, etc.). Additionally, this module offers other useful tips for dealing with anxiety states (hugging a loved one, listening to music, taking a walk outdoors). Practical tips and several possible activities are also available in the I Want to Hurt Myself module. Here, the application offers several proven tips for coping with the urge to self-harm – using ice cubes, drawing with a red pen, hitting a pillow, writing to a loved one. Users can also record methods that have worked for them and to which they can return. The module also includes a section called "How Long I Can Handle It," where users can track their progress, i.e., how long they have managed to refrain from self-harm. Similarly, the Suicidal Thoughts module follows a similar principle but with slightly different content focus. Here, users will find practical tips, reasons not to harm themselves, or breathing exercises. A relatively new section, missing in the original version of the application, is the Eating Disorders module. Here, users will find tips for specific situations related to eating disorders (guilt after eating, failure,

urge to exercise/vomit, body image, etc.). Various tasks are also available to users, such as creating a list of favorite foods, things we like about ourselves, or various challenges and motivational quotes. A practical part of this module includes recipe samples categorized by time of day and important contacts for professional help. The My Records module is primarily for self-reflection and user recordings. Here, users can record their moods, sleep information, food records, or any other thoughts that come to mind. The last, but very important, module is the Help Contacts module. In this module, the application offers a comprehensive and clear menu of professional help, divided by type of assistance (crisis centers, helplines, university counseling centers, online therapies, etc.). Users can filter these forms of assistance by selected region. (Moresová, 2019; Nepanikař, 2022)

The application is provided free of charge and is available in ten world languages. It is the first application offering initial psychological assistance also available in the Czech language. This general accessibility, supported by the Czech language, free availability, and the possibility of using the application offline, are significant advantages of this application. Experts appreciate the innovation, professional background, accessibility, and references to further professional assistance in the application. However, some warn about the inability to determine the effectiveness of this type of application and the possibility that the application may not be suitable for some users, even harmful to some. There is also a danger of confusing the application with professional help. Developers of the application strive to prevent these misconceptions by stating on their websites that the application in no way replaces professional psychological or psychiatric assistance. (Nepanikař, 2022; Haitl, 2019)

VOS

The VOS application is the result of the work of Jiří Diblík and Ondřej Kopecký, developers from the Qusion studio. Primarily, the application focuses on well-being; however, it also offers assistance with subjectively experienced stress, crisis situations, symptoms of anxiety, or depression. The application provides an individualized path to each user's goals. Immediately after downloading the application, the user is prompted to complete a short questionnaire in which the user selects the areas they primarily want to work on (productivity, improving sleep, eating healthier, having healthier relationships, better physical fitness, etc.). Based on the answers in the questionnaire, the application offers a satisfaction graph and an area it recommends focusing on. Individual goals can be changed during the process. The application then asks for several basic pieces of information, such as the user's age, gender, or diagnosed condition. (VOS 2022; Šlechta, 2022)

Similar to the Endel application, the VOS application can be integrated with other smart devices (smartwatches or other applications on the phone), thus improving the analysis of factors that may influence the user's well-being (weather, time spent on social media, physical activity, etc.). Through specific questioning, the application not only analyzes the user's mood but also offers possible explanations for what may affect the user's mood and how to prevent negative feelings. Therefore, the developers attempted to integrate artificial intelligence, machine learning, the technical aspects of smart mobile devices, as well as the latest findings from psychology, supported primarily by experts from Oxford and Palacký University in Olomouc. (Vítová, 2021; Břejčák, 2020)

The application's standout feature is its highly polished graphical interface. Users

are presented with several daily tasks and challenges to complete. These include daily mood tracking, simple tasks focused on the primary goal (for example, if the goal is to reduce anxiety and stress levels, the app assigns tasks aimed at achieving this goal, such as going for a walk). Task completion is complemented by a digital diary that users can keep and supplement with photos, videos, or various audio recordings. The application also includes a module called "Personality Tests," where users have access to various questionnaire methods to fill out (such as the General Anxiety Disorder-7, Satisfaction with Life Scale). Furthermore, the application offers the option to chat with well-being and mental health experts and provides contacts for crisis assistance if needed. (VOS, 2022)

One of the sections offered by the application is called guided journaling. The application presents users with a specific question every day, to which the user responds (for example, "Is there something you would like to change about your life right now?" or "What is your biggest wish at the moment?" or "How do you spend time with your loved ones?" etc.). Importantly, the questions are repeated after a year, allowing users to see their personal development. The advantages of guided journaling techniques in students were explored by Joanna Dunlap in her article. (2006). She states that guided journaling helps students in reflecting on and articulating their own thoughts and problem-solving, supports cognitive and metacognitive skills, and helps identify and subsequently analyze processes in problem-solving.

In summary, the strengths of this Czech application undoubtedly include its appealing graphical interface, integration with various aspects of users' lives, the availability of a free version, evidence-based backgrounds

of individual techniques, and the innovative technique of guided journaling. Given the application's strong emphasis on professional backing and citation of knowledge sources, it is essential to acknowledge the danger that the application could be considered a sufficient mental health expert, potentially giving lay users the impression that it could replace specialists in certain aspects. Ethical concerns could also arise regarding the methods provided in the application, as there is no information about who evaluates and interprets the questionnaire methods.

Wysa

Wysa is an application that combines artificial intelligence with real mental health professionals. The application is operated by an intelligent chatbot named Wysa, represented as a penguin. All interventions offered by the application are delivered in the form of chats (conversations) with Wysa. Like most applications, the theoretical foundation of the application is based on cognitive-behavioral principles. Based on the user's established goals, the application offers various techniques in individual "packs" based on cognitive-behavioral mechanisms, but also incorporates elements of dialectical behavioral therapy, mindfulness, yoga, and meditation. Specific goals vary depending on the user's focus, but generally, Wysa aims to identify current feelings and moods throughout the day and raise awareness of how these feelings affect our mental health. Immediately upon launching and welcoming the application, the user is prompted to select primary areas of focus. Topics offered include those common to previous applications (stress, sleep, motivation, anxiety, depression, relationships), as well as more specific topics (pregnancy, exam stress, loneliness, trauma, LGBTQ+ issues). Since Wysa strives to create a highly personalized and individualized environment, it further inquires about the preferred mode of guidance, whether "guided assistance" or

"self-guidance." Wysa is particularly suitable for issues related to anxiety, depression, stress, mood fluctuations, but also assists with building emotional resilience. However, it emphasizes that although psychologists and other mental health professionals contributed to its development, it does not replace face-to-face sessions with experts. In cases of serious difficulties (suicidal tendencies, self-harm, severe mental conditions), seeking professional help is necessary. (Wysa, 2022)

Wysa is among the applications with a strong theoretical and research foundation. Not only does it provide information on evidence-based support on its website, but it also offers direct links to specific studies. Utilizing the latest findings from current studies for specific interventions, Wysa provides important results from individual studies in bullet points for better user orientation during each intervention. However, if users are interested, they can directly access the entire cited study from the application. The application is also supported by the Organization for the Review of Care and Health Apps (ORCHA), which evaluates digital health apps, creating a safe environment in the field of health and digital technologies. (Wysa, 2022; Orcha, 2020) The effectiveness of the Wysa application in users with depressive symptoms was examined in a study by Inkster et al. (2018), who confirmed improvements in mood among users who used the application regularly and more frequently (referred to as "high users"). Beatty et al. investigated the therapeutic alliance between the Wysa chatbot and users. (2022). The authors conducted both quantitative and qualitative analyses, which confirmed that the strength of the therapeutic alliance with the chatbot increased over time. The results even showed comparability with the development of alliance with a real therapist.

As it is evident, the strength of the Wysa application lies primarily in its robust theoretical foundation, supported by numerous studies. The application is also highly user-friendly, with easy navigability. Individual exercises last from five to ten minutes, requiring only a minimal time commitment from the user. An advantage of the application is its division of challenges into more specific areas; for instance, if a user experiences stress, the application offers tailored interventions, addressing work-related stress, stress during pregnancy, or exam-related stress. Another benefit is the complete anonymity of the user. Unlike other applications, users do not need to register within the application, providing neither their name, email, nor any additional information, except for a chosen nickname for addressing purposes within the application. Furthermore, the application offers the option to schedule a real session with a coach or therapist. However, some authors in this section (Bell & Westphalen, 2022) may point out terminological issues. The application states that it offers therapies, but according to experts, it is more akin to coaching. The application also offers certified therapists, but they originate from India, where they reside, and according to current American legislation, these therapists cannot provide live therapy sessions; they are therefore limited to written (chat) communication. The application can be used in a free, basic version; however, the offering of techniques and interventions is very limited. For some users, the format in which the application is conducted (i.e., through chat) may also be inappropriate and even frustrating. Additionally, the application is not yet available in the Czech language. (Wysa, 2022; Bell & Westphalen, 2022)

Ethical aspects of mobile and web applications

As the field of mHealth in the Czech Republic is still developing and can be said

to be in its infancy, comprehensive legislative norms that should accompany this area are still lacking. All the limitations mentioned above can therefore be considered more as ethical issues or principles that all participants in the development of mHealth should reflect on and adhere to. But what exactly can we imagine under these ethical principles?

"Ethics calls on us to make personal, responsible decisions about what is right or best at any given moment. The law requires us to be aware of what behavior legislators or law enforcement agencies would expect in a given situation." (Lindsay, 2010, s.40) In helping professions, ethics are an integral part of the work of all professionals, and ethical principles affect their daily practice. It is therefore not surprising that ethical principles must necessarily accompany the entire field of mHealth, possibly even more significantly than in the case of personally provided interventions, given the inadequacy of laws.

Given the necessity of respecting ethical principles in interventions provided by mobile and web applications supporting mental health, it is certainly useful in this study to mention some ethical issues that may arise in connection with these applications. I will attempt to accentuate these ethical problems or dilemmas with the help of the Ethical Meta-Code of the European Federation of Psychologists' Associations, which comprehensively summarizes the necessary ethical principles that accompany helping professions. The Ethical Meta-Code, issued in 2005, emphasizes four fundamental principles that professionals in the field of mental health, especially psychologists, should adhere to. These principles include respect, competence, responsibility, and integrity. For the purposes of this study, I will select only the subpoints of each principle that may be most

problematic in the context of mHealth and applications. (Lindsay, 2010)

As the first principle, the Ethical Meta-Code introduces the principle of respect. In general, this involves a general respect for all stakeholders in helping practice – clients, their families, other professionals, the broader psychological community, etc. However, according to the meta-code, the principle of respect also relates to two very important areas: privacy and confidentiality of information, and informed consent. We have already discussed the issue of privacy and confidentiality of information. Informed consent concerns the client's right to all information about the services provided, informing them about all risks and potential benefits, the client's right to interrupt or terminate the process at any time, and their right to make informed decisions. From an ethical perspective, we may therefore ask – are applications sufficiently transparent in this regard? Do they provide comprehensive information about the possible risks of interventions? Are these pieces of information adequately emphasized throughout the process? Some applications attempt to provide information about their functioning, possible risks, and limitations of interventions. Similarly, some have built-in mechanisms capable of detecting the need to "transfer" the user to a real professional. However, problems may arise with unverified applications lacking such mechanisms or adequately informing users about potential risks or limitations, which may appear as "omnipotent" and fully replacing the services of "live" professionals.

Respecting boundaries and their observance relates to the second principle, namely the principle of competence. According to the meta-code, the principle of competence emphasizes the necessity of knowing one's own boundaries, the ability to respect these boundaries, and, in case of exceeding their limits, the ability to recommend another

professional or alternative approaches to the client. Here, we touch upon a similar principle as in the previous paragraph. Are applications capable of this "awareness"? Can they accurately assess the risks for individual users? However, the principle of competence can also be viewed from the perspective of application developers. These developers should respect their competencies in creating individual applications. They should be educated in technological principles, but they should also be experts in mental health, as content is arguably more important than form for the security of applications. This is primarily because mental health is a fragile area, and in case of problems and crises, users need to receive expert information and interventions that can help them. Otherwise, these unprofessional advice and instructions may lead to harm to the client. However, this principle also touches on the area of diagnostics. Since some applications provide certain diagnostic tools (primarily questionnaires), it is important to mention this area as well. Diagnosis is a difficult area of psychology due to the diversity of clients and their needs, the obsolescence of tools, difficulties in standardization, and communication of results, re-diagnosis, etc. These areas are very challenging for all professionals in the field of mental health. However, all these areas and related problems can be further multiplied within applications. Are applications capable of diagnostics with all its difficulties? Thorough diagnostics are necessary for determining effective interventions. However, within applications, could it rather cause harm?

No less important is the principle of responsibility. The professional bears responsibility for their professional conduct. But who is responsible for the interventions provided by applications? Is it the client themselves? Is it the professional recommending the application? Or is it the author of the application? If it is a

scientifically verified application that clearly states its authors, is based on scientific research, and alerts users to their possible risks, we can say that such an application maximally strives to fulfill the principle of responsibility. Unfortunately, in a vast number of applications, we also find those that do not provide any such information, and it is not clear who is behind the application. In these cases, complying with or even enforcing responsibility is very difficult. Therefore, professionals should, within the principle of responsibility, reflect on and recommend only scientifically verified applications that strive to fulfill this principle. These "quality" applications also adhere to other principles listed under the principle of responsibility – continuity of care and indirectly maintaining the good name of the profession (by providing effective interventions). Applications without a scientific background may violate the principle of not damaging the good name of the profession by providing unverified and often ineffective interventions.

The principle of integrity is related to the aforementioned principles. According to the meta-code, it involves maintaining one's own professional integrity, honesty, fairness, respect, and transparency. However, it also concerns the principles of honesty, accuracy, straightforwardness, and openness. Applications that seek to respect ethical principles should contain these characteristics. Clarity in providing information, the aforementioned transparent and accurate presentation of limitations and constraints, information about the background of applications, their developers, etc.

Given the nature of applications supporting mental health, it is necessary to respect ethical principles, and application developers should take these principles into account and constantly strive to maximize their fulfillment. In the aforementioned meta-code, as well as in other codes, we find

a principle that concerns one's own development, accentuating current knowledge and methods in one's own practice. The areas of eHealth and mHealth are constantly evolving and are reaching into more and more areas of human life.

Research Goals and Research Questions

Demand for psychological, psychotherapeutic, and psychiatric services in the Czech Republic is continually increasing, and mobile and web applications supporting mental health appear to be one of the possible alternatives to psychological or psychotherapeutic assistance.

One of the goals of this research is therefore to determine what kind of difficulties lead students to seek services from mobile applications supporting mental health.

Another goal is to identify and analyze the positives, benefits, and advantages that students perceive in these applications.

Given the positives, another goal is, conversely, to determine the generally perceived negatives of mental health support applications.

Finally, the last goal is to identify specific deterrent factors perceived by users that lead them to uninstall the application or stop using it.

Based on these goals, several research questions have been formulated:

- For what difficulties do college students turn to applications?
- What positives do students perceive in mental health support applications?
- What negatives do students perceive in mental health support applications?
- What are the reasons that lead students to uninstall applications?

Methodology

Within this study, a questionnaire was administered, which was analyzed using descriptive statistics. This helped not only to obtain basic information about the research sample but also to gather basic data about the respondents.

The questionnaire used in this study was created by the author. Before the actual data collection, thorough research was conducted, primarily focusing on foreign literature, aimed at identifying current research areas and thus selecting suitable questions for the questionnaire and subsequent interview part of the study. The questionnaire was introduced. It included information about the study, the focus on mobile applications supporting mental health, specifically on their utilization by university students, which this questionnaire targets, anonymity of data processing. The questionnaire consists of 20 questions. Participant can terminate the completion at any time.

The questionnaire was created using Google Forms and then shared in various social media groups (for more information on the research process, see below). Data collection thus took place online. The questionnaire was designed to obtain basic data about respondents and their use of mobile and web applications supporting mental health. It combined closed and open-ended questions. The first part of the questions primarily concerned basic information about the respondents (gender, age, university, field of study, year of study, etc.). Subsequent questions focused on the applications themselves (which applications students had heard of, whether they had any applications downloaded, how often they used them, what advantages and disadvantages they saw in the applications, etc.). After the data collection was completed, the data were exported and cleaned, with an emphasis on removing incomplete and

missing records. The exported data were processed using statistical analyses in the software "Jamovi." Descriptive analysis was conducted. For open-ended questions regarding reasons for uninstalling, primary difficulties leading to application deletion, and perceived advantages and disadvantages of applications, a brief summary of the responses was provided, categorizing them into sub-categories (e.g., financial reasons, technological aspects, unfriendly user interface, etc.). This categorization helped cover all respondents' answers in a concise and clear format. The sorting was performed using the pencil-and-paper method.

Research process

The research process began with a pilot study conducted in November and December 2022, involving the distribution of the questionnaire to family, friends, acquaintances, as well as fellow students and doctoral students at the Department of Psychology. The pilot study aimed primarily to check whether the questionnaire lacked any important areas or questions, whether all questions were sufficiently understandable for potential respondents, and whether there were any errors in the questionnaire. A total of 23 respondents participated in the pilot study. Based on several suggestions, minor adjustments were made to the questionnaire's wording (e.g., eliminating repeated words in responses) and some questions were added (e.g., a question regarding the frequency of app usage).

After the pilot study, the actual data collection took place from January 2023 to March 2023. Data collection occurred online, primarily by directly approaching students from universities across the Czech Republic and distributing the questionnaire among classmates. Another method of data collection involved sharing the questionnaire in various student groups on social media platforms. To increase respondent engagement and motivation to complete the questionnaire, an

infographic containing key information and a link to the questionnaire was created.

Data collection for the questionnaire part of the study was concluded in March 2023. A short analysis revealed that a total of 25 respondents expressed interest in participating in interviews. Eventually, 5 respondents were selected for subsequent interviews based on their questionnaire responses. Respondents were chosen based on their indication of having uninstalled an application at some point. Subsequently, respondents were selected to ensure diversity in the research sample, considering various characteristics such as age, year of study, university, field of study, and different applications used.

Ethical aspects of research

With regard to ethical standards within the research, participants were informed about the nature of the research both before the questionnaire section and before the interviews. In the questionnaire section, participants were provided with written information about the anonymization of collected data and the option to terminate the questionnaire at any time. Prior to the interviews, the purpose of the study, interview processing methods, and the option to refrain from answering any questions or withdraw from the interview at any time were reiterated. Participants were also informed about the audio recording of the interview, which served for accurate transcription purposes. Oral consent was obtained for recording the interview and for the use of interview data for research purposes. To maintain confidentiality and protect the personal data of users, recordings were immediately deleted after transcription. All names mentioned in the interviews were changed to preserve respondent anonymity.

The analysis of the questionnaire survey results

The first part of the research was attended by 597 respondents. Since it was not obligatory to answer all questions in the questionnaire, the number of responses varies for each question. The data from the questionnaire are presented according to

individual questions. Basic socio-demographic information (gender, age, year of study, university, field of study, utilization of professional services, frequency of utilization of professional services, and psychiatric diagnosis) is summarized in the table below for better clarity.

Table 1 - Basic socio-demographic information about the respondents

| | | |
|--|------------------------------------|--------------|
| Gender | Male | 472 (80,1 %) |
| | Female | 117 (19,9 %) |
| Year of study | 1st - Bachelor study | 114 (19,2 %) |
| | 2nd - Bachelor study | 92 (15,5 %) |
| | 3rd - Bachelor study | 72 (12,1 %) |
| | 4th and higher - Bachelor study | 38 (6,4 %) |
| | 1st - Master study | 118 (19,9 %) |
| | 2nd - Master study | 115 (19,4 %) |
| | 3rd and higher - Master study | 23 (3,9 %) |
| | Ph.D. study | 21 (3,5 %) |
| University | Charles University | 237 (40 %) |
| | Czech Technical University | 82 (13,8 %) |
| | Jan Evangelista Purkyně University | 48 (8,1 %) |
| | Palacký University | 48 (8,1 %) |
| | Masaryk University | 43 (7,3 %) |
| Obor studia | Humanities/Social Sciences | 294 (49,6 %) |
| | Technical | 90 (15,2 %) |
| | Natural Sciences | 87 (14,7 %) |
| | Economics and Management | 70 (11,8 %) |
| Use of professional services | Yes | 269 (45,6 %) |
| | No | 321 (54,4 %) |
| Frequency of utilization of professional services | Regular utilization | 148 (25,5 %) |
| | One-time utilization | 111 (19,1 %) |
| | Do not use | 307 (52,9 %) |
| Psychiatric diagnosis | Yes | 60 (10,2 %) |
| | No | 527 (89,8 %) |

A total of 472 women (80.1%) and 117 men (19.9%) participated in the questionnaire. The average age of the respondents was 23.4 years, with the youngest respondent being 19 years old and the oldest being 54 years old. The median age was 23 years. The most numerous group consisted of respondents aged 23 (17.3%). This was

followed by respondents aged 24 (16.1%) and 21 (13.5%). One hundred eighteen respondents (19.9%) were studying in the first year of master's degree program at the time of completing the questionnaire. Slightly fewer, a total of 115 respondents (19.4%), were in the second year of the master's degree program, and 114

respondents (19.2%) were in the first year of the bachelor's degree program.

Regarding universities, the majority of respondents studied at Charles University in Prague - a total of 237 respondents, accounting for 40% of the research sample. This was followed by the Czech Technical University in Prague (CTU) with 82 respondents (13.8%), Jan Evangelista Purkyně University in Ústí nad Labem (UJEP) with 48 respondents (8.1%). The same number of respondents also came from Palacký University in Olomouc (48 respondents, 8.1%). Forty-three respondents (7.3%) participated in the research from Masaryk University in Brno. Additionally, the questionnaire was also completed by students from Ostrava University, University of Economics in Prague, and Czech University of Life Sciences.

Regarding the field of study itself, most respondents studied humanities or social science disciplines (such as psychology, education, or law). This accounted for 294 respondents (49.6%). This was followed by students of technical fields (90 respondents, 15.2%), natural science disciplines (87 respondents, 14.7%), and economic disciplines (70 respondents, 11.8%). The specific fields of study were very diverse, ranging from psychology, special education, teaching, civil engineering to horticulture or international relations.

Psychological, psychiatric, or psychotherapeutic services were used in the past or are currently used by 269 respondents (45.6%). Regarding the frequency of use, 148 respondents (25.5%) regularly used or use these specialized services. Only once, these services were used by 111 respondents (19.1%). Sixty respondents (10.2%) have been diagnosed with a psychiatric disorder.

The above information is based on questions 1-6 of the questionnaire. The following

questions are numbered according to the questionnaire as they were presented in it.

Question No. 7 - Have you ever heard of any mobile or web applications supporting mental health? If yes, which one(s)?

Based on literature research, several applications were selected, which are described both in the theoretical part of this study and are also the focus of the research. Therefore, I will now present data on 6 mentioned applications. Two additional applications mentioned in the theoretical part, Kogito and Fabulous, were not included in the research part as they were rarely mentioned in respondents' answers.

Nearly half of the respondents (49.4%) indicated that they had never heard of any of the listed applications. 28.5% heard of at least one application, 16.4% of two applications, 5.2% of three, 0.3% of four, and 0.2% of five applications included in this study.

The majority of respondents (39%) had heard of the Napanikař application. Next, respondents had the greatest awareness of the VOS application (21.4%) and the Calmio application (13.7%). Conversely, the least known among respondents were the Endel application (0.8%), My Possible Self (1.8%), and Wysa (2.2%) applications. From the results, it is evident that the applications with the highest awareness in this research sample are those developed by Czech developers and therefore offered in the Czech language. Respondents came from the Czech, and possibly Slovak, Republics, so it is not surprising that they have the greatest awareness of applications originating from the Czech Republic. Additionally, it may be more user-friendly for users if services are offered in their native language.

However, the relatively strong performance of the Napanikař application is interesting.

The reason may be a strong campaign supported by collaboration with the non-profit organization Nevypust' duši. During workshops at high schools and now universities, lecturers can help raise awareness of this application. Furthermore, the Nepanikař application is primarily focused on crisis situations, offering quick relief for various issues (depression, anxiety, eating disorders, etc.). For the VOS and Calmio applications, it can be said that they are more "preventive" in nature. Calmio is a

meditation application, while the digital diary VOS offers the possibility of guided journaling and analysis of one's feelings and moods. Therefore, the "exclusivity" of the Nepanikař application, which is determined by its focus, may influence its higher awareness. Another undeniable advantage of the Nepanikař application is its free-of-charge nature, allowing users unlimited use of the application, which may also be one of the reasons for its "popularity".

Table 2 - Frequency Table - Awareness of all applications included in the research

| Levels | Counts | % of Total | Cumulative % |
|--------|--------|------------|--------------|
| 0 | 295 | 49.4 % | 49.4 % |
| 1 | 170 | 28.5 % | 77.9 % |
| 2 | 98 | 16.4 % | 94.3 % |
| 3 | 31 | 5.2 % | 99.5 % |
| 4 | 2 | 0.3 % | 99.8 % |
| 5 | 1 | 0.2 % | 100.0 % |

Question No. 8 – Do you have any applications downloaded? If so, which one(s)?

478 respondents (80.1%) did not have any of the listed applications downloaded at the time of filling out the questionnaire. 99 respondents (16.6%) had one application downloaded, 19 (3.2%) had two applications, and 1 respondent (0.2%) had three applications downloaded.

76 respondents (12.7%) had the Nepanikař application downloaded at the time of filling out the questionnaire. 35 respondents (5.9%) had the VOS application

downloaded, 21 respondents had the Calmio application (3.5%), 5 respondents had the Wysa application (0.8%), and only one respondent had the Endel application (0.2%). The order of applications downloaded by respondents coincides with the order of awareness of individual applications (meaning that respondents were most aware of the Nepanikař application, which is also the most downloaded application in this sample). Possible reasons why Nepanikař, VOS, and Calmio have the highest awareness (and therefore are the most downloaded) are mentioned above.

Table 3 - Frequency table - Downloads of all applications included in the study

| Levels | Counts | % of Total | Cumulative % |
|--------|--------|------------|--------------|
| 0 | 478 | 80.1 % | 80.1 % |
| 1 | 99 | 16.6 % | 96.6 % |
| 2 | 19 | 3.2 % | 99.8 % |
| 3 | 1 | 0.2 % | 100.0 % |

Question No. 9 - If yes, how did you learn about the application?

The results indicate that there are a variety of sources from which respondents learned about the application. Among respondents who are familiar with any of the applications included in the research, the majority (31.4%) learned about the application from websites or social media. 39 respondents (7%) found the application through their own search. Furthermore, respondents most commonly learned about mental health support applications from family, friends, and acquaintances (5.4%), or from various professionals (2.1%). However, some respondents (many responses with a frequency of 1) learned about the application, for example, by participating in its development, from various courses, webinars, or presentations, or from advertisements.

Question No. 10 - Have you ever used the services of a mental health support application? By usage, it is meant downloading the application and using it at least once.

More than a third of the research sample had experience with mental health support application. However, this experience may have been a one-time occurrence rather than long-term use of the application.

Question No. 11 - Do you regularly use mental health support applications? How often?

Nearly 66% of the research sample does not use apps regularly. Almost every day, only 10 people from the entire research sample use the app.

Question No. 12 - Have you ever downloaded an application and then uninstalled it?

At least one-time use of the application mentioned in this research was reported by 207 respondents (34.8%). Conversely, 388 respondents (65.2%) had never used any of the mentioned applications. Regarding frequency of usage, 16.5% of respondents reflected only one-time usage of the application. 8.9% of respondents return to the application several times a year, 4.9% of respondents multiple times a month, 2.2% utilize the application several times a week, and only a minimum of users (1.7%) utilize the application's services almost daily. 171 respondents (28.7%) stated that they had downloaded one of the applications at some point and subsequently uninstalled it. I will address the reasons that led users to uninstall one of the applications in detail below, but I will delve into them more thoroughly in the interviews (see below).

Table 4 - Frequency table - at least one-time usage of the application

| Levels | Counts | % of Total | Cumulative % |
|--------|--------|------------|--------------|
| Yes | 207 | 34.8 % | 34.8 % |
| No | 388 | 65.2 % | 100.0 % |

Table 5 - Frequency table - Frequency of app usage

| Levels | Counts | % of Total | Cumulative % |
|----------------------------|--------|------------|--------------|
| I have never used the app. | 392 | 65.9 % | 65.9 % |
| I used the app only once. | 98 | 16.5 % | 82.4 % |
| Several times a year. | 53 | 8.9 % | 91.3 % |
| Several times a month. | 29 | 4.9 % | 96.1 % |
| A few times a week. | 13 | 2.2 % | 98.3 % |
| Almost every day. | 10 | 1.7 % | 100.0 % |

Table 6 - Frequency table – Uninstallation of applications

| Levels | Counts | % of Total | Cumulative % |
|--|--------|------------|--------------|
| Yes | 171 | 28.7 % | 28.7 % |
| No | 96 | 16.1 % | 44.9 % |
| I have never downloaded any applications | 328 | 55.1 % | 100.0 % |

Question No. 13 – If the answer to the previous question is affirmative, for what reason did you uninstall the application?

Reasons for users uninstalling the application are varied and numerous. However, these reasons can be summarized as follows:

- Loss of interest or motivation (the application ceased to interest the user; feeling of the application being unnecessary);
- Financial reasons;
- Perception of ineffectiveness (lack of utility; feeling that the application brings no benefits);
- Unmet expectations;
- Unfriendly user interface (distracting environment; excessive notifications; advertisements; complexity of the application);
- Technical problems and limitations (limited phone memory; application lagging; necessity of updates);
- Alternative solutions (downloading another application; utilizing services elsewhere – counseling, websites, videos, etc.);
- Concerns about handling personal data.

Question No. 14 – What were the primary challenges that led you to seek out mental health support applications?

Below is a selection of the most common difficulties that prompted respondents to download one of the mental health support applications. The reported challenges include personal (including health-related), work-related, family-related, and academic problems. Generally, it cannot be said that only one primary reason led students to download the application. Often, it is a combination of various personal, academic, work-related, relationship, and family issues. Other reasons for seeking out the applications include:

- Curiosity (about the appearance of such an application; interest in its content; curiosity about how the application works)
- Education, self-learning, and work-related usage (e.g., when writing a study)
- Prevention
- Specific diagnosed conditions or experienced difficulties (anxiety, panic disorder, eating disorders, insomnia, etc.)

Question No. 15 – What do you perceive as the advantages of mental health support applications? What do you find most beneficial when using these applications?

The advantages, as well as disadvantages and limitations, will be further elaborated on in subsequent interviews. However, positive aspects of the applications can be summarized as follows:

- Speed;
- Accessibility;
- Flexibility;
- Anonymity;
- Cost-effectiveness;
- Simplicity;

- Mapping of one's feelings, self-reflection;
- Games; activities (electronic diary, exercises, meditation);
- Personal time; motivation for self-care;
- Destigmatization and education;
- Sense of belonging;
- Access to professionals;
- Initiating initial contact with professional help (e.g., before visiting a specialist).

Question No. 16 – Conversely, what do you perceive as the disadvantages of mental health support applications? What could be improved in these applications?

Similar to the previous question, the main analysis of disadvantages or limitations will be conducted during interviews. However, negative aspects of the applications can be categorized as follows:

- Need for payment;
- Lack of human contact;
- Inadequate personalization;
- Potential risks of applications (risk of not addressing problems with professionals; "self-diagnosis"; misinformation; inadequately designed interventions or activities);
- Ineffectiveness; feeling that the application does not help;
- Collection and storage of large amounts of data; risk of data leakage or misuse;
- Spending too much time on the phone;
- Technological aspects (long loading times; application crashes; connectivity issues);
- Stagnation of applications (lack of activities; feeling that the application is not evolving);
- Inadequate user interface (complexity of the application; unsuitable colors; unsuitable "online" environment).

Table 7 - Frequency Table – Replacement for Professional Services

| Levels | Counts | % of Total | Cumulative % |
|--------|--------|------------|--------------|
| Yes | 56 | 9.6 % | 9.6 % |
| No | 527 | 90.4 % | 100.0 % |

Question No. 19 – Have you ever used the services of an application as a substitute for professional services?

Given the concerns of some respondents, as well as the professional community, about the possibility of replacing professional services with applications, I decided to include a question in this study regarding the substitution of professional services by applications. Table 7 shows that a total of 56 respondents (9.6%) have used the services of an application as a substitute for professional psychological, psychiatric, or psychotherapeutic services.

Discussion

Within this research work, it was possible to map the basic issues regarding the utilization of mobile applications to support mental health. The study focused on university students who could potentially be active users of these services. The first research question addressed the difficulties that lead students to seek out mental health support application services. Students reported a wide range of difficulties that led them to seek out these applications. These included personal and health-related issues, including specifically addressed symptoms and diagnoses (such as anxiety, panic disorders, eating disorders, sleep problems), academic, occupational, family, or relationship-related issues. As already mentioned, however, difficulties often do not occur in isolation but are part of a complex interrelated system that can lead students to seek psychological help. These results support further studies, both foreign and domestic, which indicate that in the

context of university students, these are highly interconnected areas that usually occur together (e.g., Hobzová, 2023; Patel et al., 2021). Bláha (2022, p. 7) literally states: "the problems of students are not clearly defined and delineated. They often arise as a result of the burden and stress that students are exposed to. It is not always exclusively due to academic obligations, but rather a cocktail of all possible problems ranging from family to relationship, economic, and health issues...". However, it is also necessary to mention that it is not always just the difficulties that lead students to seek out applications. Often, it is purely curiosity, an interest in mental health issues, an interest in how the application looks and functions, prevention, education, and personal development.

The second research question focused on the positive aspects of mental health support applications from the perspective of university students. Specifically, it asked: "What positives do students perceive in mental health support applications?" Accessibility, referring to the ability to use the application anytime and anywhere, flexibility, which allows for trying out multiple applications and selecting the ideal one for the user's needs, anonymity, the ability to use the application without sharing this fact with anyone, and cost-free access, were the advantages most commonly mentioned by users. These positives align with the findings of other studies (Rozenthal et al., 2014; Peng et al., 2016; Giota & Kleftras, 2014). In their study focusing on university students, Patel et al. (2021) even state that feelings of humiliation,

embarrassment, or personal incompetence when seeking professional help for mental health issues are the main reasons why students often do not seek professional help. The second factor they mention is financial costs. Anonymity and cost-free access, classified as advantages of applications, can certainly help overcome these two barriers to accepting mental health assistance. Moreover, mental health support applications can serve as a kind of "bridge" between the client in need of professional help and the real professional. In this research, students appreciated both the initial contact with professional help through applications and the contacts with real professionals provided by these applications, which can facilitate the search for the "right" professional. Czech students' perceptions of this benefit align with the findings of the aforementioned study (Patel et al., 2021). These authors also state that within their developed application, students appreciated clarity, simplicity, and the associated speed in finding the necessary information. These factors also align with those mentioned by Czech students. Another benefit mentioned by students in this research is the opportunity for self-reflection offered by the applications. They appreciate the ability to record their own feelings through various techniques offered by the applications (games, electronic diaries, guided diaries, exercises, meditation). This recording can contribute to better mapping of their mental states or the ability to monitor their progress, which can then lead to "more responsible" work with the application, in other words, it can help motivate consistent work towards their goals. This factor is also mentioned by Hanft-Robert et al. (2021), who see the future of mental health support applications as a "companion" tool to sessions with professionals. They mention that the ability to have a mobile phone constantly available, the attractiveness of applications, and their speed can motivate clients to work on

themselves between individual sessions with real professionals.

The third research question, on the other hand, focused on the negatives that students perceive in mental health support applications. Among the reported negatives are the lack of human contact, insufficient personalization, and potential risks associated with the use of these applications (such as the risk of not addressing issues with professionals, self-diagnosis, dissemination of incorrect information, etc.). These user-perceived risks align with the risks identified by mental health professionals regarding these applications. For example, Hanft-Robert et al. (2021) analyzed risks from the perspective of psychiatrists. Although the research in this study targeted a specific group of users, it is positive to note that users agree with professionals on these factors. Another limitation perceived by users concerns the execution of the applications, whether in terms of technological aspects (long loading times, internet connection requirements, freezing), development or lack thereof, and the (non-) improvement of applications or user interfaces (graphics, color schemes, complexity of the application environment). Users perceive these factors as negatives of the applications, yet these categories can also be viewed as positives (for instance, unsatisfactory graphic interface is undoubtedly a negative; however, if the interface is user-friendly and users have the option to customize it according to their preferences, this factor certainly falls into the positives). This fact is also confirmed by Salehi et al. (2019), who analyzed over 60 mental health support applications in their study. They utilized the Mobile App Rating Scale (MARS), a tool designed to evaluate the quality of mHealth applications. Among the quality indicators in this tool are, among others, the aforementioned user interface (referred to as "aesthetics" in the tool) and mastered technological aspects (referred to

as "functionality" in the tool). Another evaluating tool in Salehi et al.'s (2019) research was the level of application personalization, i.e., whether the application provides feedback, engages in dialogue with users, or is able to provide sufficiently personalized recommendations for specific users. Again, we can see alignment in the factors mentioned by students (users) and the "expert" community, confirmed by the inclusion of similar categories in the rating tools for application evaluation. We view this alignment as very positive, as user satisfaction with applications should be accompanied by professional appraisals, and ideally, these two perspectives should converge or at least intersect.

The fourth research question, which was: "What are the reasons that lead students to uninstall applications?" focused on the individual user experience with the application and the factors that deter users from using them. The first significant deterrent factor mentioned by users is financial reasons, i.e., the necessity of payment for using the application. Financial reasons, as the main obstacle to seeking psychological help, are also identified among university students by Patel et al. (2021). We would expect financial reasons to be relevant for students who divide their time between work and study, or who work part-time or in temporary positions. However, Peng et al. (2016) confirm that the price of the application is a deterrent factor for users across age and socioeconomic groups. Therefore, this factor does not only apply to students. Interestingly, it is worth comparing the specific motivations or reasons related to application payments. Users in studies agree that the necessity of payment is not the decisive factor for them, but rather specific circumstances. In Peng et al.'s (2016) research, the willingness to pay for applications increases as the application convinces users that it "has added value," "offers something extra" that users cannot

find elsewhere. This finding also aligns with another factor mentioned by students in this study, namely, that one of the reasons for uninstalling the application is finding alternative help (videos on YouTube, websites, online forums, etc.).

Practical implications of these findings can be multifaceted. On the positive side, at least for application developers, is the fact that users are not inherently opposed to paying for applications. However, it is crucial how the application presents payment (timing, format), whether it is sufficiently transparent in presenting its services, whether it can clearly convey information about what users can expect from the application, and whether it is based on scientifically validated methods that will be effective. By addressing these factors, applications may avoid further dropouts, as they would cover another reason identified in this study as deterrent, namely, unmet expectations that users had from the application. Unmet expectations can subsequently lead to loss of interest or motivation to use the application (another reason cited by students in this study), logically leading users to drop out. One possible step to break out of this "vicious circle" of user attrition could be a recommendation proposed by one of the respondents. Specifically, this entails the comprehensive categorization of applications, i.e., a clear overview table where users could quickly find information about the general focus of the application (general well-being vs. specific issues), its user focus (students vs. children vs. adults), and also about the developers of the application and whether the application is supported by research. Given that lack of awareness about applications, or the feeling that there are too many applications and users cannot navigate them, is one of the reasons for not downloading applications, as observed in Peng et al.'s (2016) study, I consider this recommendation to be one that could help

reduce user dropouts and, above all, increase their satisfaction.

Other deterrent factors for users include unfriendly user interfaces, which can encompass disruptive application environments (advertisements, unpleasant design), application complexity, or excessive notifications, as well as technological problems and limitations, such as limited phone memory, application freezing, or the need for updates. These reasons align with findings from other studies. (Alqahtani & Orji, 2019; Thach, 2018)

The sensitivity of mental health topics can also be observed in the last deterrent factor, which is general concerns about handling sensitive data stored by applications. This factor also aligns with findings from other research (Thach, 2018; Torous et al., 2018; Peng et al., 2016). Peng et al. (2016) suggest that sharing personal information can be perceived on two levels. Firstly, the level of sharing personal information with the application itself, which can be problematic or even dangerous if it's unclear who is behind the application. In this context, users of "physical" applications concur with users of "mental" applications. However, the second context may be perceived differently, concerning the sharing of information with friends, family, and other users. As outlined above, for users in the study by Peng et al. (2016), this sharing can be motivating and beneficial. Conversely, users in the research for this study perceive this sharing as one of the deterrent factors.

Limits of the research

Like all research studies, this research also has certain limitations. Firstly, there are limitations related to the administered questionnaire. The questionnaire was created by the author specifically for the purposes of this study. Although a pilot study was conducted to check the clarity of

the questionnaire, it was not further validated or standardized. Therefore, some respondents may not have fully understood the questions or may have interpreted them differently than intended by the author, potentially leading to biased results. Another limitation is that the questionnaire was administered online, allowing anyone to fill it out. Although the questionnaire was described as intended for university students in the survey description, infographic, and shared posts on social media, it is possible that it was completed by individuals who are not currently attending university. One limitation, which could also be seen as a potential inspiration for further research, is the overrepresentation of women. This gender imbalance applies to both the questionnaire and the interviews. Although some studies (e.g., Smith, 2008) demonstrate that women are generally more willing to participate in online surveys, this imbalance can still be considered a limitation of the study due to the lack of representativeness of the research sample. Therefore, it would be appropriate to include more men in future research in this area. Regarding the representativeness of the sample, respondents who had already uninstalled one of the applications were deliberately selected for the interview portion of the study. Therefore, the subsequent interviews may have been influenced by this fact, and the selected respondents may have had a more critical and negative attitude towards the applications. Additionally, during the analysis of the interviews, other potential topics emerged (such as the role of applications in mental health care) that were not further explored.

Conclusion

This research focused on mental health support applications among university students. Given the limited number of studies or articles on the topic of eHealth,

mHealth, and mobile applications supporting mental health in the Czech context, we see the contribution of this work in raising awareness of this topic and potentially motivating further research. Through administering the questionnaire and sharing it among students on social media, there was feedback indicating that students were previously unaware of such applications, and the research motivated them to seek out and explore these applications. Thus, the significance of this research also lies in disseminating much-needed awareness about mental health and the necessity of caring for it.

However, since applications are certainly not perfect and have certain limitations, mapping out these limitations and risks can also be beneficial. Reflecting on these limitations can be useful in prevention, support, and mental health care.

References

- Alqahtani, F. & Orji, R. 2019. Usability issues in mental health applications. *Proceedings of UMAP '19: 26th Conference on User Modeling, Adaptation and Personalization*. S. 343-348. Dostupné z: <https://doi.org/10.1145/3314183.3323676>. [cit. 2023-07-15].
- Armontrout, J. A.; Torous, J.; Cohen, M., McNeil, D. E. & Binder, R. 2018. Current Regulation of Mobile Mental Health Applications. *J Am Acad Psychiatry Law*. 46(2), s. 1-8. Dostupné z: [10.29158/JAAPL.003748-18](https://doi.org/10.29158/JAAPL.003748-18). [cit. 2023-07-15].
- Balagam, I. 2022. 2022 Fabulous App Review: How Does It Work? *Healthline*. Dostupné z: <https://www.healthline.com/health/mental-health/fabulous-app-review>. [cit. 2022-11-09].
- Beatty, C., Malik, T., Meheli, S. & Sinha, Ch. 2022. Evaluating the Therapeutic Alliance With a Free-Text CBT Conversational Agent (Wysa): A Mixed-Methods Study. *Frontiers in Digital Health*, 4, s. 1-8. Dostupné z: <https://doi.org/10.3389/fdgth.2022.847991>. [cit. 2022-11-09].
- Bell, C. & Westphalen, D. 2022. Wysa App Review 2022: Pros & Cons, Cost, & Who It's Right For. *Choosing Therapy*. Dostupné z: <https://www.choosingtherapy.com/wysa-app-review/>. [cit. 2022-11-16].
- Bláha, F. 2022. Vysokoškolské poradenství v ČR: Mezi strategií a realitou. *Universitas magazín vysokých škol*. S. 1-19. Dostupné z: <https://www.csvs.cz/wp-content/uploads/vysokoskolske-poradenstvi-v-cr-mezi-strategii-a-realitou-filip-blaha.pdf>. [cit. 2023-07-26].
- Brejčák, P. 2019. Calmio je první česká meditační aplikace podložená vědou. I deset minut denně pomáhá, hlásí zakladatelé. *Czechcrunch s.r.o.* Dostupné z: <https://cc.cz/calmio-je-prvni-ceska-meditacni-aplikace-podlozena-vedou-i-deset-minut-denne-pomaha-hlasi-zakladatele/>. [cit. 2022-11-01].
- Brejčák, P. 2020. Méně stresu a spokojenější život. Miton investuje 5 milionů korun do českého digitálního deníku VOS. *Czechcrunch s.r.o.* Dostupné z: <https://cc.cz/mene-stresu-a-spokojenejsi-zivot-miton-investuje-5-milionu-korun-do-ceskeho-digitalniho-deniku-vos/>. [cit. 2022-11-16].
- Calmio, 2022. *Calmio*. Dostupné z: <https://www.calmio.cz/>. [cit. 2022-11-01].
- Cogan, N. A., Liu, X., Chau, Ch.-V., Kelly, S. & Anderson, T. et al., 2023. The taboo of mental health problems, stigma and fear of disclosure among Asian international students: implications for help-seeking, guidance and support. *British Journal of Guidance & Counselling*. S. 1-19. Dostupné z: <https://doi.org/10.1080/03069885.2023.2214307>. [cit. 2023-11-01].

- Daňková, M. 2019. Nepanikař. Nová aplikace pomáhá lidem zvládat depresi i myšlenky na sebevraždu. *Aktuálně.cz*. Dostupné z: <https://magazin.aktualne.cz/dobre-zpravy/nepanikar-nova-aplikace-pomaha-lidem-zvladat-depresi-i-mysle/r~7f431c4259fe11e98aa4ac1f6b220ee8/>. [cit. 2022-11-15].
- Doležalová, E. 2021. Mobilní aplikaci jsem vymýšlel už při studiu, říká psychiatr věnující se duševnímu zdraví maminek. Online. *Pozitivní zprávy*. Dostupné z: <https://pozitivni-zpravy.cz/mobilni-aplikaci-jsem-vymyslel-uz-pri-studiu-rika-psychiatr-venuujici-se-dusevniemu-zdravi-maminek/>. [cit. 2022-11-10].
- Dunlap, J. C, 2006. Using guided reflective journaling activities to capture students' changing perceptions. Online. *TechTrends*. S. 20-26. Dostupné z: <https://doi.org/10.1007/s11528-006-7614-x>. [cit. 2023-07-06].
- Ebert, D. D., Cuijpers, P., Muñoz, R. F. & Baumeister, H. 2017. Prevention of mental health disorders using internet- and mobile-based interventions: a narrative review and recommendations for future research. *Frontiers in psychiatry*, 8, s. 1-16. Dostupné z: <https://doi.org/10.3389/fpsy.2017.00116>. [cit. 2023-07-06].
- Endel, 2022. *Endel*. Dostupné z: <https://endel.io/>. [cit. 2022-11-02].
- Fabulous*, 2022. Dostupné z: <https://www.thefabulous.co/>. [cit. 2022-11-09].
- Giota, K. G. & Kleftras, G. 2014. Mental health apps: innovations, risks and ethical considerations. Online. *E-Health Telecommunication Systems and Networks*. Vol. 3, no. 3, s. 19-23. Dostupné z: [10.4236/etsn.2014.33003](https://doi.org/10.4236/etsn.2014.33003). [cit. 2023-08-05].
- Haitl, J. 2019. Nepanikař. Nebuď sám. Napiš někomu blízkému. Cestu z deprese může ukázat nová aplikace pro mobily. Online. *ČT24*. Dostupné z: <https://ct24.ceskatelevize.cz/domaci/2910923-nepanikar-nebud-sam-napis-nekomu-blizkemu-cestu-z-deprese-muze-ukazat-nova-aplikace>. [cit. 2022-11-15].
- Hanft-Robert, S., Tabi, K., Gill, H., Endres, A. & Spokova, M. et al., 2021. Mental health mobile apps for patients: Psychiatrists' concerns. *European Psychiatry*. Dostupné z: <https://doi.org/10.1192/j.eurpsy.2021.928>. [cit. 2023-08-05].
- Haruvi, A., Kopito, R., Brande-Eliat, N., Kalev, S. & Kay, E. et al., 2022. Measuring and Modeling the Effect of Audio on Human Focus in Everyday Environments Using Brain-Computer Interface Technology. Online. *Frontiers in computational neuroscience*. Vol. 15, s. 1-17. Dostupné z: <https://doi.org/10.3389/fncom.2021.760561>. [cit. 2022-11-02].
- Hayes, T. 2020. The science behind Endel's AI-powered soundscapes. Online. *Amazon Science*. Dostupné z: <https://www.amazon.science/latest-news/the-science-behind-endels-ai-powered-soundscapes?fbclid=IwAR2yMft9089II Bso 4s9GWvb1Q0b95NMg8SOJVIFIH 6y0FjrGB7SvLjPpuo>. [cit. 2022-11-02].
- Hobzová, I. Neúspěch u přijímaček, zkoušky, maturity... je to opravdu psychicky náročné. Mladí ale stále bojují s nálepkou „snowflakes“. *Refresher*. 2023. Dostupné z: <https://refresher.cz/137368-Neuspech-u-prijimacek-zkousky-maturity-je-to-opravdu-psychicky-narocne-Mladi-ale-stale-bojuji-s-nalepkou-snowflakes>. [cit. 2023-07-26].
- Inkster, B., Shubhankar, S. & Subramanian, V. 2018. An empathy-driven, conversational artificial intelligence agent (Wysa) for digital mental well-being: real-world data evaluation mixed-methods study. *JMIR mHealth and uHealth*. Vol. 6, no. 11, s. 1-14. Dostupné z:

- <http://dx.doi.org/10.2196/12106>. [cit. 2022-11-09].
- Knight, W. E.J. & Rickard, N. S., 2001. Relaxing music prevents stress-induced increases in subjective anxiety, systolic blood pressure, and heart rate in healthy males and females. *Journal of music therapy*. 38(4), s. 254-272. Dostupné z: [10.1093/jmt/38.4.254](https://doi.org/10.1093/jmt/38.4.254). [cit. 2022-11-02].
- Kogito, 2022. *Kogito*. Dostupné z: <https://www.kogito.cz/>. [cit. 2022-11-10].
- Lecomte, T., Potvin, S., Corbière, M., Guay, S. & Samson, C. et al, 2020. Mobile apps for mental health issues: meta-review of meta-analyses. *JMIR mHealth and uHealth*, 8(5), s. 1-14. Dostupné z: [10.2196/17458](https://doi.org/10.2196/17458). [cit. 2023-07-06].
- Lindsay, G. 2010. *Etika pro evropské psychology*. Praha: Triton.
- Luxton, D. D; McCann, R., Bush, N., Mishkind, M. C. & Reger, G., 2011. mHealth for mental health: Integrating smartphone technology in behavioral healthcare. *Professional psychology: research and practice*, 42(6), s. 505-512. Dostupné z: [10.1037/a0024485](https://doi.org/10.1037/a0024485). [cit. 2023-07-06].
- Mertová, J. 2021. Zklidněte to. Těchto osm aplikací vám pomůže zvládnout stres a začít nový rok s vyrovnanou myslí. Online. *Forbes*. Dostupné z: <https://forbes.cz/zklidnete-to-techto-osm-aplikaci-vam-pomuze-zvladnout-stres-a-zacit-novy-rok-s-vyrovnanou-mysli/>. [cit. 2022-11-01].
- Moresová, M. 2019. Na smrt myslí neustále. Lidí s depresemi přibývá, sebevraždám brání aplikace. *Deník.cz*. Dostupné z: <https://www.denik.cz/zdravi/prepadne-je-obava-ze-smrti-lidi-s-deprese-mi-pribyva-sebevrazdam-brani-aplikace-20190614.html>. [cit. 2022-11-15].
- My possible self, 2022. *My Possible Self*. Dostupné z: <https://www.mypossibleself.com/>. [cit. 2022-11-15].
- Nepanikař, 2022. *Nepanikař*. Dostupné z: <https://nepanikar.eu/>. [cit. 2022-11-15].
- Nevypust' duši, 2022. *Nevypust' duši*. Dostupné z: <https://nevypustduzi.cz/>. [cit. 2022-11-15].
- Nosková, A. 2020. Čechy netrápí výkonnost, ale sebevědomí, říkají tvůrci první české meditační aplikace. *Forbes*. Dostupné z: <https://forbes.cz/cechy-netrapi-vykonnost-ale-sebevedomi-rikaji-tvurci-prvni-ceske-meditacni-aplikace/>. [cit. 2022-11-01].
- Orcha, 2020. Coronavirus: Apps to help self-management. *ORCHA*. Dostupné z: <https://orchhealth.com/coronavirus-apps-to-help-self-management/>. [cit. 2022-11-16].
- Patel, S. M.; Mittal, J. B., Pai, S. S.; Nagda, J. K. & Valvi, M. K., 2021. Psyche - Mental Health Application for Students based on Cognitive Behavioral Therapy. *International Journal of Science and Research Technology*. Vol. 6, iss. 8, s. 942-948. Dostupné z: https://www.researchgate.net/publication/354596869_Psyche_-_Mental_Health_Application_for_Students_based_on_Cognitive_Behavioral_Therapy. [cit. 2022-11-25].
- Peng, W., Kanthawala, S., Yuan, S. & Hussain, S. A. 2016. A qualitative study of user perceptions of mobile health apps. *BMC public health*. No. 1158, s. 1-11. Dostupné z: [10.1186/s12889-016-3808-0](https://doi.org/10.1186/s12889-016-3808-0). [cit. 2023-07-30].
- Priory Health Experts, 2022. Introducing you to My Possible Self - your mental health support app. *Priory Health Care*. Dostupné z: <https://www.priorygroup.com/mps>. [cit. 2022-11-15].
- Rozental, A., Andersson, G., Boettcher, J., Ebert, D. D. & Cuijpers, P. et al, 2014. Consensus statement on defining and measuring negative effects of Internet interventions. *Internet interventions*, 1(1), s. 12-19. Dostupné z: <https://doi.org/10.1016/j.invent.2014.02.001>. [cit. 2023-07-15].
- Salehi, F., Kermani, Z. A., Khademian, F. & Aslani, A. 2019. Critical Appraisal of Mental Health Applications. *Stud Health Technol Inform*. S. 303-308. Dostupné z:

- 10.3233/978-1-61499-975-1-303. [cit. 2023-07-15].
- Smith, W. G. 2008. Does gender influence online survey participation? A record-linkage analysis of university faculty online survey response behavior. *Online submission*. S. 1-21. Dostupné z: <https://files.eric.ed.gov/fulltext/ED501717.pdf>. [cit. 2023-10-01].
- Stoyanov, S. R., Hides, L., Kavanagh, D. J., Zelenko, O. & Tjondronegoro, D. et al., 2015. Mobile App Rating Scale: A New Tool for Assessing the Quality of Health Mobile Apps. *JMIR mHealth uHealth*. 3(1), s. 1-9. Dostupné z: [10.2196/mhealth.3422](https://doi.org/10.2196/mhealth.3422). [cit. 2023-11-11].
- Svoboda, M., Krejčířová, D. & Vágnerová, M. 2021. Psychodiagnostika dětí a dospívajících. Vydání čtvrté. Praha: Portál.
- Šebela, A., Nosková, E., Kosová, J., Kubrichtová, V. a Boháč, O. a kol., 2021. Kogito. *Národní ústav duševního zdraví*. Dostupné z: https://www.nudz.cz/fileadmin/user_upload/Ke_stazeni/Vyzkum/Vysledky/kogito.pdf. [cit. 2022-11-10].
- Šlechta, R. 2022. Zdravější, produktivnější, klidnější. Týden jsem používal českou aplikaci VOS. health na zlepšení mentálního zdraví. *Refresher*. Dostupné z: <https://refresher.cz/120129-Zdravejsi-produktivnejsi-klidnejsi-Tyden-jsem-pouzival-ceskou-aplikaci-VOS-health-na-zlepseni-mentalniho-zdravi>. [cit. 2022-11-16].
- Thach, K. S. 2018. User's perception on mental health applications: a qualitative analysis of user reviews. *2018 5th NAFOSTED Conference on Information and Computer Science (NICS)*. S. 47-52. Dostupné z: [10.1109/NICS.2018.8606901](https://doi.org/10.1109/NICS.2018.8606901). [cit. 2023-07-15].
- Tobias, G., Sgan-Cohen, H., Spanier, A. B. & Mann, J. 2021. Perceptions and Attitudes Toward the Use of a Mobile Health App for Remote Monitoring of Gingivitis and Willingness to Pay for Mobile Health Apps (Part 3): Mixed Methods Study. *JMIR Formative Research*. 5(10), s. 1-12. Dostupné z: [10.2196/26125](https://doi.org/10.2196/26125). [cit. 2023-11-03].
- Torous, J., Nicholas, J., Larsen, M. E., Firth, J. & Christensen, H. 2018. Clinical review of user engagement with mental health smartphone apps: evidence, theory and improvements. *Online. BMJ Ment Health*. Vol. 21, no. 3, s. 116-119. Dostupné z: [10.1136/eb-2018-102891](https://doi.org/10.1136/eb-2018-102891). [cit. 2023-07-16].
- Úsměv mámy, 2020. *Úsměv mámy*. Dostupné z: <https://www.usmevmamy.cz/>. [cit. 2022-11-10].
- Vítová, N. 2021. Dvacet milionů na lepší psychiku. Českou aplikaci VOS.health podpořil Reflex Capital miliardáře Fryce. *Forbes*. Dostupné z: <https://forbes.cz/dalsich-dvacet-milionu-do-dusevniho-zdravi-ceskou-aplikaci-vos-health-podporil-reflex-capital-miliardare-fryce/>. [cit. 2022-11-16].
- VOS, 2022. VOS. Dostupné z: <https://vos.health/>. [cit. 2022-11-16].
- Wakefield, S., Kellet, S., Simmonds-Buckley, M., Stockton, D. & Bradbury, Abigail et al., 2021. Improving Access to Psychological Therapies (IAPT) in the United Kingdom: A systematic review and meta-analysis of 10-years of practice-based evidence. *British Journal of Clinical Psychology*. 60(1), s. 1-37. Dostupné z: [10.1111/bjc.12259](https://doi.org/10.1111/bjc.12259). [cit. 2023-07-16].
- Wysa, 2022. Wysa. Online. Dostupné z: <https://www.wysa.io/>. [cit. 2022-11-16]

Contact

Mgr. Lenka Petrželková

Pedagogical-psychological counseling center of the Ústí Region

E-mail: petrzelkova@seznam.cz

PhDr. Anna Frombergerová, Ph.D.

Faculty of Education Charles University

Email: anna.frombergerova@pedf.cuni.cz