THE JOURNAL OF CONCURRENT DISORDERS

CDS PRESS

Open Access Original Research

ELSI workshop methods for developing needs-based implementation options for mental health apps with AI features

Annina Böhm-Fischer, Dipl.-Psych., Luzi M. Beyer, PhD

Citation: Böhm-Fischer, A., Beyer, L.M. (2023). ELSI workshop methods for developing needs-based implementation options for mental health apps with AI features. Journal of Concurrent Disorders.

Founding Editor-in-Chief: Masood Zangeneh, Ph.D.

Editor: Chris Lo, Ph.D.

Received: 09/28/2022
Accepted: 05/07/2023
Published: 05/29/2023

[1]Alice Salomon Hochschule Berlin, Germany
[2]ORCiD: 0000-0001-7856-4699
*Corresponding author: Annina Böhm-Fischer, fischer@ash-berlin.eu

Abstract. *Objectives:* Post-traumatic stress disorder (PTSD) is a common psychological burden for (adolescent) refugees. Therefore, low-threshold and target group-oriented support services are needed. *Methods:* an artificial-intelligence-based PTSD self-screening tool was developed and integrated into a support app, which was also developed within the project itself. To make the app attractive, a target group analysis was implemented with adolescent refugees in Germany (N = 53; age 20.2 years, SD = 3.2; average length of stay in Germany 4.6 years, SD = 1.4) regarding desired psychoeducational offers and content. *Results*: The adolescents showed a strong interest in visually presented information, self-directed posting, and peer chat. Responses were discussed in an interdisciplinary workshop for the ethical legal and social impact (ELSI-workshop) (N = 12) to generate implementation options as follows. To enable self-determined posting and protect privacy, it was agreed to allow anonymous user uploads after an administrator check to ensure quality and maintain anonymity. For the peer chat, an implementation with trained young adults (age 18 - 25), with migration experience but without traumatization, was considered suitable, if they are integrated into support and supervision structures. Furthermore, it was decided to prepare existing information materials (e. g., about traumatization and different forms of therapy) as video and infographics. *Conclusion and Implications*: This article shows how the development of technology for vulnerable target groups can be implemented in a user-oriented manner while taking ELSI aspects into account.

Keywords: Minor Refugees, App Development, Value Sensitive Design, ELSI.

Background

Global emigration has grown in recent decades (Guersoy, 2021) and will continue to increase (Haller, 2018). Reasons include major economic upheavals, lack of political participation opportunities, resource scarcity, and wars (Bang & Mitra, 2013; Castles, 2003). For young people from the Middle East and North Africa, this is compounded by the effects of climate change, intra-state conflicts, and subsequently a pervasive sense of insecurity (Gertel, et al., 2017). That is why the larger proportion of refugees are (unaccompanied) minors (Jensen, 2019) and young people from the Middle East and North Africa represent a large proportion of the underage refugees in Europe. According to studies, over 40 percent of refugee minors have experienced physical assault, 38 percent have seen armed conflict, 25 percent have faced dead bodies (in their country of origin and/or during migration), 15 percent have been physically assaulted themselves, 23 percent have been physically abused, and up to 9 percent have been sexually abused (Bean, Derluyn, Eurelings-Bontekoe, Broekaert, & Spinhoven, 2006; Perkonigg, Kessler, Storz, & Wittchen, 2000; Ruf, Schauer, & Elbert, 2010). Many of them are traumatized because of this (Blackmore, et al., 2020) and face social and psychological challenges upon arrival in host countries (Mahon, 2022).

If left untreated, these young refugees are vulnerable to developing persistent and enduring mental health problems with the inevitable personal, family, social, and occupational consequences associated with mental illness (Fergusson, Boden, & Horwood, 2007). This is particularly tragic given that the well-being of refugee minors is essential for their successful integration in host countries (Walther, Fuchs, Schupp, & Von Scheve, 2020). In addition to the social responsibility aspect, treatment and integration also has the advantage that it could counteract the shortage of skilled workers and demographic change in Europe (Schenner & Neergaard, 2019). Support for refugees can be enhanced by new technologies (e.g., health apps, artificial intelligence) if they are low-threshold and targeted (Vymetal, et al., 2011). Digital mental health apps can expand access to mental health for those who are difficult to reach with traditional forms of mental health support and treatment (Malik, Ambrose, & Sinha, 2022), such as refugee minors. Unfortunately, targeted support is still patchy (Wachter, et al., 2022).

Apps can support mental health with diverse offerings. They can promote self-management with reminders and motivational messages, provide useful and understandable mental health information (Neary & Schueller, 2018), improve treatment quality of therapies with personalized ad-ons (e.g., diary features), support general health awareness with expert information (Heidel & Hagist, 2020), help with self-assessment with AI - artificial intelligence (D'Alfonso, 2020), or provide emotional support through social interaction. Of the currently available apps for PTSD (post-traumatic stress order), some work with established therapy concepts such as cognitive behavioral therapy and relaxation exercises (Sander, et al.,

2020), some focus on self-management tools (Kuhn, et al., 2018) and some apps are based on gamification (Drissi, Ouhbi, Idtissi, & Ghogho, 2019), but there are only a few that have more than one offering (Van Ameringen, Turna, Khalesi, Pullia, & Patterson, 2017) and despite the broad spectrum that apps offer overall, the currently available PTSD apps are of average quality at most, have very limited offerings individually (Sander, et al., 2020), and regrettably, only about 30 percent of apps include social features such as chat (Drissi, Ouhbi, Idrissi, & Ghogho, 2020).

Since the majority of available apps are not scientifically sound as well as evidence-based (Neary & Schueller, 2018) and some even contain harmful content (Larsen, et al., 2019), there is a possibility that apps may be harmful for particularly vulnerable people (Drissi, Ouhbi, Idrissi, & Ghogho, 2020). This makes the benefits seem more than questionable (Van Ameringen, Turna, Khalesi, Pullia, & Patterson, 2017). Another point that unfortunately has to be criticized is the low involvement of target group as well as experts in the development of apps, even though most minor refugees have mobile phones and are suitable as active participants (Mendoza Pérez & Morgade Salgado, 2020). Not even one-fifth of apps (19%) reported involving mental health professionals in the design (Drissi, Ouhbi, Idrissi, & Ghogho, 2020), and only the minority of apps (14%) are developed with the inclusion of the experiences and opinions of affected individuals (Larsen, et al., 2019), although co-creation of mental health apps is desired by users (Alqahtani, Winn, & Orji, 2021) and also recommended in ethical principles (Jones & Moffitt, 2016).

However, a combination of versatile offerings is likely needed for refugee minors, as studies show that mental health awareness among refugee minors tends to be low (Bergman, et al., 2021) and they will not install multiple apps. A targetable new offering would be to combine AI for screening, information for improving mental health literacy, and emotional support through chat. In perspective, chatbots could interact with people with PTSD, track their moods, and improve mental health literacy through information. However, chatbots (even though they are improving) are still perceived as incomprehensible (Sweeney, et al., 2021) and still need revision (Abd-Alrazaq, et al., 2021).

Currently, it seems more line-leading to implement a chat with peers, as interventions with peers seem to be effective in addressing many of the challenges (Mahon, 2022). Of course, neither an AI chatbot nor peers are a substitute for a therapist or other professional (Gamble, 2020), especially since AI, while effective, is often limited by insufficient engagement (Malik, Ambrose, & Sinha, 2022) and smartphone apps cannot be recommended as the only psychological intervention given the current evidence base (Weisel, et al., 2019). New apps should not only be needs-based but also versatile, provide support through real human interaction rather than chatbots, use AI selectively, integrate experts and users to be evidence-based, qualitative, and ensure engagement. But they also have to

be ELSI-compliant; that is, they have to consider ethical, legal and social impacts.

Objectives

The collaborative project TraM ("Traumatisierte Minderjährige Geflüchtete verstehen und unterstützen"; engl. “Understanding and Supporting of Traumatized Minor Refugees;”), developed an artificial intelligence (AI) based on speech and emotion recognition. The aim is to enable refugee minors to self-screen for post-traumatic stress disorder (PTSD) in their native language (Arabic). The system should provide feedback as well as information on PTSD and counseling services and be integrated into an app. The aim of using this new technology is to provide an age-appropriate and recipient-oriented supplement to the current offerings of the healthcare system in order to meet the challenges facing society. At the same time, these technologies are to be designed with an eye to the future and on the basis of fundamental ethical values. Furthermore, prejudices against current offers (e.g., short-term therapy) on the part of refugees are to be reduced and access options (e.g., practice facilities) made comprehensible. Another goal of the app is to connect minor refugees with therapeutic professionals and help centers. For this purpose, the AI is embedded in a smartphone app and is thus, in contrast to conventional offers (Bourla, Mouchabac, El Hage, & Ferreri, 2018; Einsle, Kraft, & Köllner, 2012), very low-threshold and usable in the native language of the refugees (Arabic). Thus, minor refugees can get an age-appropriate impression of the concept of "traumatization" and receive information on support services. In order to make the planned app attractive and recipient-oriented for minor refugees and to minimize acceptance risks (Marangunić & Granić, 2015), potential future users were asked in a requirements analysis which content, offerings and presentation formats they prefer. The results of the data collected was discussed and processed by the collaborative partners in an ELSI workshop (ethical, legal & social impact). Since topics such as data sensitivity, protection of user groups, and data protection needs are particularly large among the project's target group, the results of requirements analyses are reflected intensively with regard to ELSI aspects.

Method 1- Requirement Analysis

Since user involvement in early stages of development brings a number of benefits (Fischer, Peine, & Östlund, 2020) such as optimization on demand and increasing sustainability, it is increasingly practiced in agile projects and in scientific practice (Ferreira, et al., 2021; Bano, Zowghi, & da Rimini, 2018). The requirements analysis was conducted with the aim of implementing the paradigm of care (Manzeschke, 2015; Coughlan, et al., 2013), in which the goal is to stringently implement ethical considerations and goals in further technical developments. The needs, expectations, and desires of users are the focus of the development.

Design and Analysis

In the first step of the requirements analysis, existing support and information portals for minor refugees were reviewed and their content offerings (e. g., healthcare system, asylum law) were recorded. In parallel, support offers that promote successful integration were extracted from scientifically published literature (Hynie, 2018; Turrini, et al., 2021). The offerings collected in the field were supplemented with those obtained from the literature.

In the course of a workshop of the project partners (N = 12, consisting of the interdisciplinary project team of psychologists, computer scientists, social workers, and project research assistant), clear and non-overlapping response categories were formed by means of card sorting (Nawaz, 2012). For this purpose, all offers were written individually on cards and these were grouped according to logical connections. For cards with redundant content, generic terms were generated in order to use them for the requirements analysis. In total, 13 topics (e.g., school system, family reunification, youth welfare) were extracted in order to capture them as topics in the planned survey (see Figure 1).

In addition to these 13 topics, other relevant aspects such as language skills, media use, and attitudes towards peer support (compared to professional support) were identified as relevant in the workshop, further concretizing support needs and framework conditions. Subsequently, the questions on topics and relevant aspects were finalized as requirements and needs of potential users for a support app, realized in easy language (Maaß, 2020), as the requirements analysis was conducted in German. Because the data of underage (unaccompanied) refugees is particularly worthy of protection (Malgieri & Niklas, 2020; Munro, Holmes, & Ward, 2005), it was also important to ensure anonymity and minimize the potential for conflict, which is why the survey was conducted online.

The conducted survey was covered by the ethics vote of the Alice Salomon University Ethics Committee and in accordance with the 2013 Declaration of Helsinki. Informed consent was obtained from all participants (or their parents) for being included in the study. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5).

Procedure and Participants

A total of 55 people took part in the requirements analysis, including 35 men. The average age was 20.2 years (SD = 3.2 years) with an average length of stay in Germany of 4.6 years (SD = 1.4 years). The language proficiency survey showed that all participants were able to read and speak Arabic (100%), and in addition, the majority were proficient in German (88.9% read and 92.5% speak) and English (66.7% read and 50.9% speak).

Other language skills included French (11.1% read and 7.5% speak), Spanish (9.3% read and 5.7% speak), and Turkish (5.6% read and 7.5% speak).

Materials and Measures

The empirical implementation was carried out with the online survey tool *Limesurvey* (installed on the project's own servers) in the period from 28.08.2020 to 01.11.2020. The link was disseminated in Facebook groups, at other projects with underage refugees, by means of flyers as well as in practice facilities.

The questionnaire began with informed consent (in German and Arabic) from all patients to participate in the study. Thereafter, sociodemographic data of the participants such as age, gender, level of education, number of completed school years and duration of stay in Germany were collected.

The questionnaire had 14 content-related questions. The first question was "Which websites do you use regularly?" and had a free response field. The second question was about on current media usage behavior "What do you like to do most on these sites?" and had 9 answer options (like, comment, share content, watch videos, upload videos, share photos, read, chat, look up information) of which several answer options were selectable as well as a free input field ("Other, namely ...").

The third question was "Which of the following topics are you interested in?" and had the 13 topics from the workshop as well as a free input field as an answer option (multiple choices possible, see Fig. 1).

It further asked "In what areas would you like support?" (response options: government, recreation, school and other, namely…) and "What kind of support do you wish you had in these areas?" (free input field).

Questions 7 through 12 all had the same response format (yes, no) and asked about the desire for chat support (general) chat support with peers, chat support with experts, chat support from other people with the same home country, and whether there was a general desire for contact with peers. Question 13 asked which type of chat is preferred (text, video, both) and the final question 14 was a free input field for other wishes for an app.

Results 1

The results of the online survey show that there is very high interest in the topics of the workplace/job, youth welfare, and the school system in Germany. In other words, topics that are very directly aimed at social integration. Topics like family reunification and the German law are moderately interesting. Information on health care, the right of asylum and

residence, and the health counseling are rated as relevant least often (see figure 1).

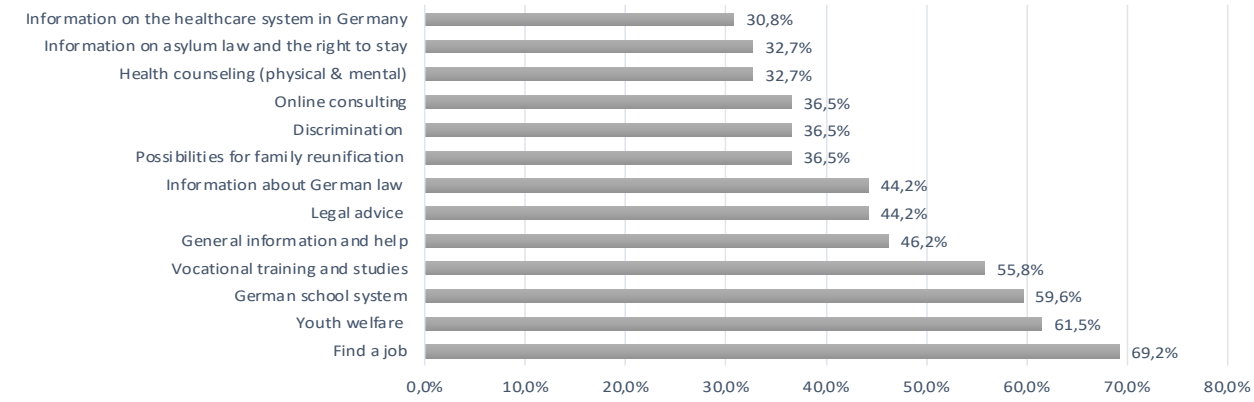

Figure 1: Desired topics for the content offers (N=52; three people did not rate any of the topics as relevant; multiple answers were possible)

The survey on current media usage behavior showed that the focus is on watching videos, chatting, and looking at photos (see Figure 2). Next to this rather passive consumption, active sharing of videos or photos lags far behind.

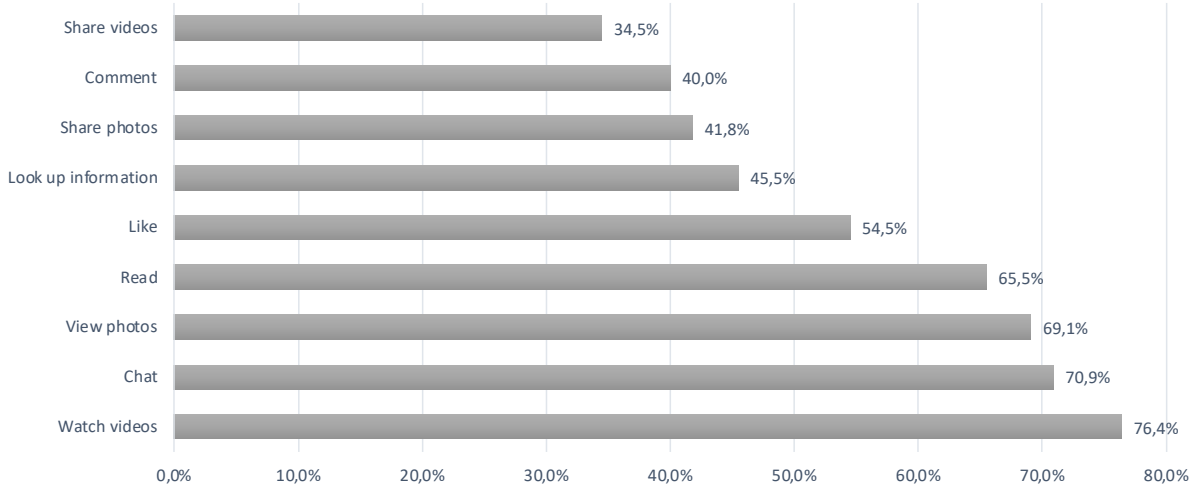

Figure 2: Preferred media use (N=55; multiple answers were possible)

Questions about the desire for chat support revealed the following: 20.0% of respondents generally prefer text chats, 14.5% prefer video chats, and 34.5% have no preference between video and chat. The remaining respondents (31%) indicated a preference for a particular option depending on the topic. Deviating from these more global responses, however, it appeared that when interacting with other refugee youth, the preference for text chat increased from 20.0% to 59.4%.

In terms of attitudes towards peer support, it was found that 81.8% would like someone to help them with problems but only 51.2% would like

psychological counseling, while 82.9% would like contact peers who have experienced something similar. It was also found that the free input fields were almost not used at all.

Discussion

The results show that the topic of mental health is not considered relevant by young refugees. Information about the health care system and about (physical and mental) health is hardly desired, and interaction with experts for (psychological) counseling and support is also desired by only half of the respondents. These results correspond to those of other studies that underage refugees tend to focus on arriving and want to integrate (Wångdahl, Lytsy, Mårtensson, & Westerling, 2014; Höhne, van der Meer, Kamp-Becker, & Christiansen, 2020).

Method 2 – ELSI-Workshop

The aim of the second study was to evaluate together with the entire project team how the answers from the requirements analysis can be implemented in the further development steps without violating ethical ideals. Since the TraM project consistently follows ethical guidelines and deals responsibly with the possibilities of artificial intelligence and eHealth, there are regular workshops in the project (e.g., on data ethics, critical whiteness) in which the project team reflects together with external stimulus providers. Furthermore, the project has global project-internal ELSI dimensions and categories, which apply to all project phases and outputs and are discussed in the quarterly project meetings (Bente, Egelhaaf, & Zorn, 2019).

The ELSI dimensions come from Value Sensitive Design (Friedman & Hendry, 2019), are primarily guidelines for planning phases and are used in projects with a process focus (internal focus). The ELSI categories are derived from the MEESTAR model (Model for the Ethical Evaluation of Socio-Technical Arrangements; Weber, 2015), which enables the ethical evaluation of socio-technical arrangements and is consequently used to assess the process output.

In the project, three internal ELSI dimensions are derived from Value-Sensitive Design (Friedman & Hendry, 2019). The dimensions relate on the one hand to individual needs (e. g. security and self-determination), on the other hand to the position of the individual in society (justice and participation), and finally to supra-individual, overall societal topics regarding innovation (sustainability). In the context of the project, all dimensions are relevant for the design process, but for concrete decisions concerning the implementation for the benefit of the users, the individual need dimension is the most important. However, dilemmas often arise due to requirements (e.g., legal) or other wishes/interests. Three recurring dilemmas at the individual need dimension are: Self-determination/security and privacy as well as the specific dilemma of user desires and freedom

from harm as well as the cross-cutting themes of responsibility and care. Privacy and concerns are particularly important in this context, as they are negatively associated with the willingness to share personal information, the intention to accept services (Lee & Cranage, 2011) and among the top barriers to mobile health services (del Río-Lanza, Suárez-Vázquez, Suárez-Álvarez, & Iglesias-Argüelles, 2020). Therefore, privacy concerns must be adequately addressed in the early stages of the development process (Ahmadian, 2020).

Six ELSI categories were derived from the MEESTAR Model (Model for the Ethical Evaluation of Socio-Technical Arrangements; Weber, 2015) to evaluate implementation ideas. The first category is "Data protection". This category includes points such as documenting all data accesses in writing, collecting data as sparingly as possible and the app and in minimizing outsourcing to third parties. The second category ("Fostering") contains issues such as diversity among developers, training data that is as close to the like target group as possible and legal implications (e. g. of the Constitutional law), while the third category ("Damage prevention") includes details as regular check of the functionality, updates and the protection of all persons involved. The fourth category ("Autonomy") includes factors such as comprehensibility of the mode of operation and overdriveability. The penultimate category is "Fairness". This category includes considerations such as the evaluation for bias, check data representativeness and equity. The last category ("Transparency") includes for example the following aspects: publication of the code, explanations of the operation and decisions for users.

By combining Value-Sensitive Design and the MEESTAR model (Friedman & Hendry, 2019; Weber, 2015), the project aims to develop technology in such a way that ethical principles, considerations and values are fully and procedurally taken into account by already made explicit when designing the app and reflected on in the team. For a holistic ethical consideration, the developed technology ideas are then evaluated with an ethical focus.

Design and Analysis

As a basis for discussion and reflection in the current ELSI workshop, two dilemmas (self-determination/security vs. privacy and user wishes vs. freedom from harm) and the cross-cutting issue (responsibility and care) were derived from value-sensitive design (Friedman & Hendry, 2019) and as process orientation used for the development of ideas from the results of the requirements analysis. For the evaluation of the ideas developed, three categories (privacy, promotion and loss prevention) from the ethical evaluation model (Weber, 2015) were identified in order to then discuss the results. In concrete terms, this means that the extent of the collection of user data, user needs and their feasibility as well as the content of the app were put up for discussion.

Participants and Procedure

After the data collection period of the requirements analysis, there was a meeting for the joint evaluation of the answers and subsequent reflection on how these can be taken into account in the development of the app (implementation of study 2, ELSI workshop). All project partners were invited to this meeting. A total of N=12 participants (consisting of the interdisciplinary project team of psychologists, computer scientists, social workers, and project research assistant) were involved in the ELSI workshop to derive implementation strategies. The workshop was from 10 a.m. to 4 p.m. (including 1.5-hour breaks), was present at one of the project partner universities and was moderated by the first author.

The workshops consisted of the following five steps:
– Joint consideration of user wishes from the requirements analysis
– Development of implementation ideas (Value-Sensitive Design)
– Identifying ethical problems
– Approaches to solving ethical problems
– Evaluation of the solutions and joint assessment (MEESTAR)

There are four ratings in the MEESTAR: 1. Application is completely harmless from an ethical point of view, 2. Application shows ethical sensitivity, but this can be taken into account in practice, 3. Application is ethically extremely sensitive and requires permanent attention or cannot be implemented, 4. Application is to be rejected from an ethical point of view. These four scores were used in all generated solutions.

The workshop was recorded in a protocol and the results, which were partly made as mockups, were recorded as photos.

Results 2

Regarding the result that most young people are interested in information about jobs, the school system and youth welfare (Fig. 1), the project team noted that there is a lot of information about this in other (government) apps, but it is often complicated and verbal. It was discussed how costly it would be to prepare this in simple language and visually appealing. This would meet user requests and provide responsibility and care. The addition of appropriate information was judged to be completely unobjectionable from an ethical point of view.

In relation to the results of the requirements analysis that people like to share and view photos and videos (see Figure 2), three potential ways of implementation were developed. The first option would be to allow self-directed posting to be completely free. This would satisfy self-determination and user desires. However, this possibility goes hand in hand with the fact that discriminatory and questionable content can also be disseminated in the app and contradicts responsibility and care. Furthermore, a lot of user data must be collected in order to be able to report violations and the content must be constantly monitored to ensure freedom from harm. It was stated

that it is necessary to collect user data (IP Address and personal data) in order to enable independent and self-determined posting of information, contributions, videos and photos. The reason for this is that it must be possible to trace who posted what and when in the event of violations (e.g., cyberbullying, racist comments). This is the only way to ensure security with regard to content and to protect users. On the other hand, however, there is privacy and the goal of data economy (ELSI category “Data protection”). The idea received a rating of "ethically extremely sensitive and requires constant attention or cannot be done."

The second option would be to not allow users to post at all. Then far less user data would have to be collected (privacy) while at the same time ensuring freedom from harm. However, this would severely limit the attractiveness of the app. The idea was deemed impractical and was not subject to ethical evaluation.

The third option would be to allow anonymous posting of photos and videos, but to make them visible only after an initial check by the administrator. This option would meet the user's wishes and at the same time allow privacy (anonymity of posters) and freedom from harm. This way, the content can be controlled, and users can be protected from bullying. Considering data security, fostering and damage prevention, this solution was evaluated with "Application is completely harmless from an ethical point of view".

Next, users' desire to chat with peers (rather than experts) was discussed. For a matching of different users in the chat function, it was considered how matching can happen without collecting personal data from the user (ELSI category “Data protection” and “Fostering” - legal implications) is. Both aspects are in the dilemma “self-determination/security and privacy” (Sadeghi, 2021). In order to protect privacy as much as possible, it was also decided that peer matching would not need to involve user data like e.g., age or gender, as is often done (Lyngs, Binns, Van Kleek, & Shadbolt, 2018) and was originally planned. Instead, a selection of the desired peer partners based on the peer characteristics (e.g., existing language skills, knowledge of the desired topics such as youth welfare or the school system) is considered more in line with ELSI considerations.

It was brought up that even though the implementation itself is feasible, the desire for peer support itself is critical because "true peers" would also be minors and had flight experiences that may have been traumatic. Even without the presence of a PTSD diagnosis, an uninformed and untrained implementation of the peer chat could lead to harm among the peers through reactivation of their own upsetting experiences. It was stated that it is (1.) questionable how suitable they are for psychological support for others and (2.) need to be protected from (re-) traumatization themselves; thus, the responsibility for harmlessness and care for (mental) health refers to both groups and is not compatible with “Damage

prevention" and is located on the dimension "dilemma of user desires (Andalibi & Flood, 2021) and freedom from harm".

For the peer chat in the workshop, it was pointed out that a desired form of implementation with trained young adults (age 18 to 21 years) with migration experience but without traumatization is justifiable, because it was unanimously assessed as ethically unjustifiable to allow minors as well as traumatized persons as peers. Potential peers must therefore be of age and tested for PTSD (to best also depression) and embedded in structures with supervision and support. In addition, it was discussed that the project would need to create informational materials specifically for the peers (e.g., on the construct of trauma and possible forms of therapy) to help them become resilient, informed, and supportive peers. This option was deemed "extremely sensitive ethically and requires constant attention."

It was also noted that the peers must also have a police record before they are allowed to work with refugee minors (freedom from harm). In view of the great effort (on the part of the project and the peers) it would not be expedient to have many peers, but rather a few who can actually implement this task.

In the original conception of the app, it was planned that the supporting experts would also take over the technical support (e.g., view and release the uploaded photos and videos). If the experts do not exist but the chat is implemented with peers, the function would either have to be taken over by extra people or by the peers. Whether there are peers who are suitable for this technically complicated task also for the chat seems questionable to the project team. Furthermore, it is possible that the uploaded contributions contain racist and traumatizing content. The project team decided to work out possible solutions in another meeting.

In addition to this, it was discussed how the content of the website can be implemented in a target group appropriate way from the point of view of responsibility and care. As further evaluation steps, it was decided to test the usability of the prototype and to create a questionnaire on the subjective perception of safety.

Discussion

The requirements analysis showed that the underage refugees would like to arrive and are interested in topics such as training and jobs and would also like to come into contact with other young people with the same background. The joint consideration of the desired topics and the preferred presentation of the information (videos, photos) led to the conclusion that the desired topics should be age and target group appropriate as well as visually appealing. This information could then be used by both peers and users and would thus be more low-threshold and recipient-oriented.

However, the contact request to peer in the app is critical. Accordingly, the cross-cutting issues of responsibility and support were very prominent in the workshop and related on the one hand to the actual

target group for the app but also to the peers, the use of the app, and the implementation and content of the website. Data protection, on the other hand, which plays a major role in many projects when considering implementation (XX), was hardly discussed. The focus was on responsibility toward the peers, as they would need to be informed, provided with materials, and embedded in a support structure. Responsibility and care towards users relates to the quality of information and peer chat. In addition, these topics are also associated with acceptance risks and legal implications (DSGV & evaluation of personal data) during implementation.

That a development with the Value Sensitive Design focuses on customer needs has many advantages, because the focus on self-determination and privacy of the users is important and responsibility and care are made explicit. However, an ethical evaluation of the ideas (as with the MEESTAR) is inevitable, especially with vulnerable groups and potentially critical user wishes, because data protection, fostering and damage prevention are tasks that must be considered during the development. If the development were based on the original ideas (e.g., with experts and other topics), the app would probably not be accepted. If the evaluation were focused primarily on data protection, the project team would have come to other decisions that would not be ethically acceptable.

Limitation

The studies and the results are limited by the participants themselves (in the survey and in the workshop), lack of diversity on the part of the workshop participants, and current technical and financial possibilities of the project. What is considered ethically acceptable is always context dependent and cannot be answered globally and finally.

Conclusion and Implications

The requirements analysis was an important step to capture needs and gain insights (Alqahtani & Orji, 2020) and the ELSI workshop provides valuable insights for embedding technological solutions to address societal and cultural challenges (Punukollu & Marques, 2019; Radovic, et al., 2016), to increase acceptance of human-computer interaction with particularly challenging target groups.

Just like other studies, the requirements analysis showed that minor refugee's social interaction and young people in control are important factors (Kenny, Dooley, & Fitzgerald, 2016). However, while another study showed that video chat is important for teenagers to connect with friends and see emotional reactions (Buhler, Neustaedter, & Hillman, 2013), minor refugees prefer text chats for sensitive topics according to the requirements analysis. The reason for this could be that emotions remain private in text chats unless they are explicitly written. In line with theories (Walther J. B., 1996), it would also be conceivable that chats are preferred because neither face nor voice are identifiable and thus anonymity is preserved in this implementation, which is important to the target group because they fear

persecution and surveillance. The fact that advice from peers in cyberspace is readily accepted is also evident in other studies (Suzuki & Calzo, 2004), which explains the preference for peer chat. At first glance, it was surprising that topics such as health and the health care system were only assessed as having limited relevance. However, this assessment corresponds to that of young adults without experience of flight or migration (Freeman, Caldwell, Bennett, & Scott, 2018) and studies that show a rather low e-health literacy among underage refugees (Bergman, Nilsson, Dahlberg, Jaensson, & Wångdahl, 2021).

Interestingly, the requirements analysis also shows that technological trust as well as self-determined motivation are significantly related, which has already been shown in studies on wearable fitness technology (Rupp, Michaelis, McConnell, & Smither, 2016) as the underage refugees would like to post autonomously in the context of trust to the peers and the possibility to exchange.

In the ELSI workshop, targeted and feasible solutions were found for the users' wishes and for identified ethical or legal problems. This shows how practicable the project's internal dimensions and categories are. Consistent with studies, safety is important for adolescents in mental health apps (Kenny, Dooley, & Fitzgerald, 2016) and should be taken seriously, also with regard to data - which is unfortunately often not the case at present (Huckvale, Nicholas, Torous, & Larsen, 2020). The solution with the resilient, informed and supported peers is target-oriented for the peer chat (O'Leary, Schueller, Wobbrock, & Pratt, 2018), but has to be evaluated again within the project with the target group (e.g., subjective security), as well as the usability of the prototype. The development effort for this will be large, because usability testing is too rarely done for health apps (Grist, Rebecca, Porter, & Stallard, 2017), often has limitations (Dawson, et al., 2020), and is rarely based on validated frameworks (Chan, Torous, Hinton, & Yellowlees, 2015; Hensher, et al., 2021). In addition, many evaluation tools are for experts (e.g., mHAT), rather than end users (Azad-Khaneghah, Neubauer, Cruz, & Liu, 2021; O'Rourke, Pryss, Schlee, & Probst, 2020) and there are only questionnaires on subjective safety when using websites (Corritore, Kracher, & Wiedenbeck, 2003) in general and chatbots (Jian, Bisantz, & Drury, 2000), but not for from AI (Note 1).

For the further course of the project, it was decided to survey usability and trust towards the prototype, since there is little knowledge about the user perceptions of AI-driven self-diagnosis (Baldauf, Fröehlich, & Endl, 2020) and usability of PTSD apps (Rodriguez-Paras, et al., 2017).

Overall, requirements analysis and ELSI workshop showed that there is not only a high need for information and support for minor refugees, but also demonstrated in line with other studies, that acceptability is important (Chan & Honey, 2022). This results in the need to adapt current practices. Apps are suitable to minimize acceptance risks (Chandrashekar, 2018), to generate added value compared to conventional offers and to advance patient empowerment (Van Haasteren, Vayena, & Powell, 2020).

For this, however, offers must not only be suitable in terms of content, but also low-threshold, age-appropriate, and recipient-oriented. To prevent elite-centric access to AI (Mabweazara & Mare, 2021; Stubbe, Wessels, & Zinke, 2019), it is not enough to develop artificial intelligence for good purposes; it must also be ensured that it is accepted and that uptake happens (Torous, Nicholas, Larsen, Firth, & Christensen, 2018) so that hopefully in the future smartphone-apps for PTSD treatment become more effective than waitlist control conditions (Goreis, Felnhofer, Kafka, Probst, & Kothgassner, 2020).

Funding
None.

Availability of data and material
Data will be made available upon reasonable request.

Conflict of Interest
All authors declare that they have no conflict of interest.

Author's contributions
All authors significantly contributed to the research and preparation of manuscript.

Informed Consent
Informed consent was obtained from all participants (or their legal guardians) for being included in the study.

Ethics Approval
The TraM project was closely supervised by the university's internal ethics committee and external ethics advisors, and an ethics vote was obtained for each survey.

Note 1: An unvalidated version of the developed questionnaire for assessing subjective safety in the use of artificial intelligence in easy English can be requested from the second author.

References

Abd-Alrazaq, A. A., Alajlani, M., Ali, N., Denecke, K., Bewick, B. M., & Househ, M. (2021). Perceptions and opinions of patients about mental health chatbots: scoping review. *Journal of medical Internet research, 23*(1), e17828.

Ahmadian, A. (2020). Model-based privacy by design. *Universität Koblenz-Landau, Universitätsbibliothek, Disseration*, 251.

Alqahtani, F., & Orji, R. (2020). Insights from user reviews to improve mental health apps. *Health informatics journal, 26*(3), 2042-2066.

Alqahtani, F., Winn, A., & Orji, R. (2021). Co-Designing a Mobile App to Improve Mental Health and Well-Being: Focus Group Study. *JMIR formative research, 5*(2), e18172.

Andalibi, N., & Flood, M. K. (2021). Considerations in designing digital peer support for mental health: Interview study among users of a digital support system (Buddy Project). *JMIR mental health, 8*(1), e21819.

Azad-Khaneghah, P., Neubauer, N., Cruz, A. M., & Liu, L. (2021). Mobile health app usability and quality rating scales: a systematic review. *Disability and Rehabilitation: Assistive Technology, 16*(7), 712-721.

Baldauf, M., Fröehlich, P., & Endl, R. (2020). Trust me, I'ma doctor–user perceptions of AI-driven apps for mobile health diagnosis. *19th International Conference on Mobile and Ubiquitous Multimedia*, 167-178.

Bang, J. T., & Mitra, A. (2013). Civil war, ethnicity, and the migration of skilled labor. *Eastern Economic Journal, 39*(3), 387-401.

Bano, M., Zowghi, D., & da Rimini, F. (2018). User involvement in software development: the good, the bad, and the ugly. *IEEE Software, 35*(6), 8-11.

Bean, T., Derluyn, I., Eurelings-Bontekoe, E., Broekaert, E., & Spinhoven, P. (2006). Validation of the Multiple Language Versions of the Reactions of Adolescents to Traumatic Stress Questionnaire. *Journal of Traumatic Stress, 19*(2), 241-255.

Bente, S., Egelhaaf, B., & Zorn, I. (2019). ELSI-Scrum als integrierte ELSI-by-Design-Entwicklungsmethode für Technologieprojekte. *Mensch und Computer 2019-Workshopband*, 30-31.

Bergman, L., Nilsson, U., Dahlberg, K., Jaensson, M., & Wångdahl, J. (2021). Health literacy and e-health literacy among Arabic-speaking migrants in Sweden: a cross-sectional study. *BMC public health, 21*(1), 1-12.

Blackmore, R., Boyle, J. A., Fazel, M., Ranasinha, S., Gray, K. M., Fitzgerald, G., & Gibson-Helm, M. (2020). The prevalence of mental illness in refugees and asylum seekers: a systematic review and meta-analysis. *PLoS medicine, 17*(9), e1003337.

Bourla, A., Mouchabac, S., El Hage, W., & Ferreri, F. (2018). e-PTSD: an overview on how new technologies can improve prediction and assessment of Posttraumatic Stress Disorder (PTSD). *European Journal of Psychotraumatology*, 9(sup1), 1424448.

Buhler, T., Neustaedter, C., & Hillman, S. (2013). How and why teenagers use video chat . *Proceedings of the 2013 conference on Computer supported cooperative work*, 759-768.

Castles, S. (2003). Towards a sociology of forced migration and social transformation. *sociology, 37*(1), 13-34.

Chan, A. H., & Honey, M. L. (2022). User perceptions of mobile digital apps for mental health: Acceptability and usability-An integrative review. *Journal of Psychiatric and Mental Health Nursing, 29*(1), 147-168.

Chan, S., Torous, J., Hinton, L., & Yellowlees, P. (2015). Towards a framework for evaluating mobile mental health apps. *Telemedicine and e-Health, 21*(12), 1038-1041.

Chandrashekar, P. (2018). Do mental health mobile apps work: evidence and recommendations for designing high-efficacy mental health mobile apps. *Mhealth, 4*(6).

Corritore, C. L., Kracher, B., & Wiedenbeck, S. (2003). On-line trust: Concepts, evolving themes, a model. *International Journal of Human-Computer Studies, 58*(6), 737-758.

Coughlan, H., Cannon, M., Shiers, D., Power, P., Barry, C., Bates, T., . . . McGorry, P. (2013). *Towards a new paradigm of care: the International Declaration on Youth Mental Health.* (Version 2). Royal College of Surgeons in Ireland.

Dawson, R. M., Felder, T. M., Donevant, S. B., McDonnell, K. K., Card III, E. B., King, C. C., & Heiney, S. P. (2020). What makes a good health 'app'? Identifying the strengths and limitations of existing mobile application evaluation tools. *Nursing inquiry, 27*(2), e12333.

del Río-Lanza, A. B., Suárez-Vázquez, A., Suárez-Álvarez, L., & Iglesias-Argüelles, V. (2020). Mobile health (mhealth): facilitators and barriers of the intention of use in patients with chronic illnesses. *Journal of Communication in Healthcare, 13*(2), 138-146.

D'Alfonso, S. (2020). AI in mental health. *Current Opinion in Psychology*(36), 112-117.

Drissi, N., Ouhbi, S., Idrissi, M. A., & Ghogho, M. (2020). An analysis on self-management and treatment-related functionality and characteristics of highly rated anxiety apps. *International journal of medical informatics, 141*, 104243.

Drissi, N., Ouhbi, S., Idtissi, M. A., & Ghogho, M. (2019). Gamification-based apps for PTSD: An analysis of functionality and characteristics. *2019 IEEE/ACS 16th International Conference on Computer Systems and Applications (AICCSA)*, 1-6.

Einsle, F., Kraft, D., & Köllner, V. (2012). Post-traumatic stress disorder (PTSD) in cardiology and oncology—which diagnostic tools should be used? *Journal of psychosomatic research, 72*(6), 434-438.

Fergusson, D. M., Boden, J. M., & Horwood, L. J. (2007). Recurrence of major depression in adolescence and early adulthood, and later mental health, educational and economic outcomes. *The British Journal of Psychiatry, 191*(4), 335-342.

Ferreira, B., Kalinowski, M., Gomes, M. V., Marques, M. C., Lopes, H., & Barbosa, S. (2021). Investigating Problem Definition and End-User Involvement in Agile Projects that Use Lean Inceptions. *Brazilian Symposium on Software Quality*, 1-10.

Fischer, B., Peine, A., & Östlund, B. (2020). The importance of user involvement: a systematic review of involving older users in technology design. *The Gerontologist, 60*(7), e513-e523.

Freeman, J. L., Caldwell, P. H., Bennett, P. H., & Scott, K. M. (2018). How adolescents search for and appraise online health information: A systematic review. *The Journal of pediatrics*, 195, 244-255.

Friedman, B., & Hendry, D. G. (2019). *Value sensitive design: Shaping technology with moral imagination.* Cambridge, Massachusetts: MIT Press.

Gamble, A. (2020). Artificial intelligence and mobile apps for mental healthcare: a social informatics perspective. *Aslib Journal of Information Management, 72*(4), 509-523.

Gertel, J., Hexel, R., Geese, L. A., Zimmermann, K., Butterly, C., Nord, M., & Geese, L. A. (2017). *Zwischen Ungewissheit und Zuversicht: Jugend im Nahen Osten und in Nordafrika.* Bonn: Dietz.

Goreis, A., Felnhofer, A., Kafka, J. X., Probst, T., & Kothgassner, O. D. (2020). Efficacy of self-management smartphone-based apps for post-traumatic stress disorder symptoms: a systematic review and meta-analysis. *Frontiers in neuroscience*, *14*(3).

Grist, Rebecca, Porter, J., & Stallard, P. (2017). Mental health mobile apps for preadolescents and adolescents: a systematic review. *Journal of medical internet research, 19*(5), e7332.

Gürsoy, S. I. (2021). Refugees and Climate Change. *Refugee Crisis in International Policy, 4*, 277-285.

Höhne, E., van der Meer, A. S., Kamp-Becker, I., & Christiansen, H. (2020). A systematic review of risk and protective factors of mental health in unaccompanied minor refugees. *European Child & Adolescent Psychiatry*, 1-15.

Haller, M. (2018). Millionen AfrikanerInnen werden nach Europa kommen. In M. Haller, *Migration & Integration* (pp. 167-182). Verlag der österreichischen Akademie der Wissenschaften.

Heidel, A., & Hagist, C. (2020). Potential benefits and risks resulting from the introduction of health apps and wearables into the German statutory health care system: scoping review. *JMIR mHealth and uHealth, 8*(9), e16444.

Hensher, M., Cooper, P., Dona, S. W., Angeles, M. R., Nguyen, D., Heynsbergh, N., . . . Peeters, A. (2021). Scoping review: development and assessment of evaluation frameworks of mobile health apps for recommendations to consumers. *Journal of the American Medical Informatics Association, 28*(6), 1318-1329.

Huckvale, K., Nicholas, J., Torous, J., & Larsen, M. E. (2020). Smartphone apps for the treatment of mental health conditions: status and considerations. *Current opinion in psychology*, 36, 65-70.

Hynie, M. (2018). Refugee integration: Research and policy. *Peace and Conflict: Journal of Peace Psychology, 24*(3), 265.

Jensen, M. A. (2019). Gender-based violence in refugee camps: Understanding and addressing the role of gender in the experiences of refugees. *Inquiries Journal, 11*(2), 1.

Jian, J. Y., Bisantz, A. M., & Drury, C. G. (2000). Foundations for an empirically determined scale of trust in automated systems. *International journal of cognitive ergonomics, 4*(1), 53-71.

Jones, N., & Moffitt, M. (2016). Ethical guidelines for mobile app development within health and mental health fields. *Professional Psychology: Research and Practice, 47*(2), 155.

Kenny, R., Dooley, B., & Fitzgerald, A. (2016). Developing mental health mobile apps: Exploring adolescents' perspectives. *Health informatics journal, 22*(2), 265-275.

Kuhn, E., van der Meer, C., Owen, J. E., Hoffman, J. E., Cash, R., Carrese, P., & Iversen, T. (2018). PTSD Coach around the world. *Mhealth, 4*(15).

Larsen, M. E., Huckvale, K., Nicholas, J., Torous, J., Birrell, L., Li, E., & Reda, B. (2019). Using science to sell apps: evaluation of mental health app store quality claims. *NPJ digital medicine, 2*(1), 1-6.

Lee, C. H., & Cranage, D. A. (2011). Personalisation-privacy paradox: The effects of personalisation and privacy assurance on customer responses to travel Web sites. *Tourism Management, 32*(5), 987–994.

Lyngs, U., Binns, R., Van Kleek, M., & Shadbolt, N. (2018). So, tell me what users want, what they really, really want! *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems*, 1-10.

Maaß, C. (2020). *Easy Language–Plain Language–Easy Language Plus: Balancing comprehensibility and acceptability.* Berlin: Frank & Timme.

Mabweazara, H. M., & Mare, A. (2021). *Participatory journalism in Africa: Digital news engagement and user agency in the South.* London: Routledge.

Mahon, D. (2022). A scoping review of interventions delivered by peers to support the resettlement process of refugees and asylum seekers. *Trauma Care, 2*(1), 51-62.

Malgieri, G., & Niklas, J. (2020). Vulnerable data subjects. *Computer Law & Security Review, 37*, 105415.

Malik, T., Ambrose, A. J., & Sinha, C. (2022). User Feedback Analysis of an AI-Enabled CBT Mental Health Application (Wysa). . *JMIR Human Factors, 9*(2), e35668.

Manzeschke, A. (2015). MEESTAR: Ein Modell angewandter Ethik im Bereich assistiver Technologien. . In M. Martin, *Technisierung des Alters – Beitrag zu einem guten Leben* (pp. 263-283).

Marangunić, N., & Granić, A. (2015). Technology acceptance model: a literature review from 1986 to 2013. *Universal access in the information society, 14*(1), 81-95.

Mendoza Pérez, K., & Morgade Salgado, M. (2020). Mobility and the mobile: A study of adolescent migrants and their use of the mobile phone. *Mobile Media & Communication, 8*(1), 104-123.

Munro, E. R., Holmes, L., & Ward, H. (2005). Researching vulnerable groups: Ethical issues and the effective conduct of research in local authorities. *British Journal of Social Work, 35*(7), 1023-1038.

Nawaz, A. (2012). A comparison of card-sorting analysis methods. *10th Asia Pacific Conference on Computer Human Interaction. Matsue-city, Shimane, Japan.*, 28-31.

Neary, M., & Schueller, S. M. (2018). State of the field of mental health apps. *Cognitive and Behavioral Practice, 25*(4), 531-537.

O'Leary, K., Schueller, S. M., Wobbrock, J. O., & Pratt, W. (2018). "Suddenly, we got to become therapists for each other" Designing Peer Support Chats for Mental Health. *Proceedings of the 2018 CHI Conference on Human Factors in Computing*, 1-14.

O'Rourke, T., Pryss, R., Schlee, W., & Probst, T. (2020). Development of a multidimensional app-quality assessment tool for health-related apps (AQUA). *Digital Psychology, 1*(2), 13-23.

Perkonigg, A., Kessler, R. C., Storz, S., & Wittchen, H. U. (2000). Traumatic events and post-traumatic stress disorder in the community: prevalence, risk factors and comorbidity. *Acta psychiatrica scandinavica, 101*(1), 46-59.

Punukollu, M., & Marques, M. (2019). Use of mobile apps and technologies in child and adolescent mental health: a systematic review. *Evidence-based mental health, 22*(4), 161-166.

Radovic, A., Vona, P. L., Santostefano, A. M., Ciaravino, S., Miller, E., & Stein, B. D. (2016). Smartphone applications for mental health. *Cyberpsychology, Behavior, and Social Networking, 19*(7), 465-470.

Rodriguez-Paras, C., Tippey, K., Brown, E., Sasangohar, F., Creech, S., Kum, H.-C., . . . Benzer, J. K. (2017). Posttraumatic stress disorder and mobile health: app investigation and scoping literature review. *JMIR mHealth and uHealth, 5*(10), e7318.

Ruf, M., Schauer, M., & Elbert, T. (2010). Prävalenz von traumatischen Stresserfahrungen und seelischen Erkrankungen bei in Deutsch- land lebenden Kindern von Asylbewerbern. *Zeitschrift für Klinisch-Psychologische Psychotherapie*, 39(3), 151-160.

Rupp, M. A., Michaelis, J. R., McConnell, D. S., & Smither, J. A. (2016). The impact of technological trust and self-determined motivation on intentions to use wearable fitness technology. *Proceedings of the human factors and ergonomics society annual meeting, 60*(1), 1434-1438.

Sadeghi, A.-R. (2021). Technical perspective: The real-world dilemma of security and privacy by design. *Communications of the ACM, 64*(10), 84-84.

Sander, L. B., Schorndanner, J., Terhorst, Y., Spanhel, K., Pryss, R., Baumeister, H., & Messner, E. M. (2020). 'Help for trauma from the app stores?'A systematic review and standardised rating of apps for Post-Traumatic Stress Disorder (PTSD). *European journal of psychotraumatology, 11*(1), 1701788.

Schenner, J. K., & Neergaard, A. (2019). Asylum-seekers and refugees within Europe and labour market integration. *Transfer: European Review of Labour and Research, 25*(1), 13-24.

Stubbe, J., Wessels, J., & Zinke, G. (2019). Neue Intelligenz, neue Ethik? In V. Wittpahl, *Künstliche Intelligenz* (pp. 239-254). Berlin, Heidelberg: Springer Vieweg.

Suzuki, L., & Calzo, J. (2004). The search for peer advice in cyberspace: An examination of online teen bulletin boards about health and sexuality. *Journal of applied developmental psychology, 25*(6), 685-698.

Sweeney, C., Potts, C., Ennis, E., Bond, R., Mulvenna, M. D., O'neill, S., . . . Mctear, M. (2021). Can Chatbots help support a person's mental health? Perceptions and views from mental healthcare professionals and experts. *ACM Transactions on Computing for Healthcare, 2*(3), 1-15.

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. *Evidence-based mental health, 21*(3), 116-119.

Turrini, G., Tedeschi, F., Cuijpers, P., Del Giovane, C., Kip, A., Morina, N., & Barbui, C. (2021). A network meta-analysis of psychosocial interventions for refugees and asylum seekers with PTSD. *BMJ global health, 6*(6), e005029.

Van Ameringen, M., Turna, J., Khalesi, Z., Pullia, K., & Patterson, B. (2017). There is an app for that! The current state of mobile applications (apps) for DSM-5 obsessive-compulsive disorder, posttraumatic stress disorder, anxiety and mood disorders. *Depression and anxiety, 34*(6), 526-539.

Van Haasteren, A., Vayena, E., & Powell, J. (2020). The Mobile health app trustworthiness checklist: usability assessment. *JMIR mHealth and uHealth, 8*(7), e16844.

Vymetal, S., Deistler, A., Bering, R., Schedlich, C., Rooze, M., Orengo, F., . . . Krtickova, M. (2011). European commission project: European guideline for target group-oriented psychosocial aftercare—implementation. *Prehospital and disaster medicine, 26*(3), 234-236.

Wachter, K., Bunn, M., Schuster, R. C., Boateng, G. O., Cameli, K., & Johnson-Agbakwu, C. E. (2022). A scoping review of social support research among refugees in resettlement: Implications for conceptual and empirical research. *Journal of Refugee Studies, 35*(1), 368-395.

Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication research, 23*(1), 3-43.

Walther, L., Fuchs, L. M., Schupp, J., & Von Scheve, C. (2020). Living conditions and the mental health and well-being of refugees: evidence from a large-scale German survey. . *Journal of immigrant and minority health, 22*(5), 903-913.

Wångdahl, J., Lytsy, P., Mårtensson, L., & Westerling, R. (2014). Health literacy among refugees in Sweden–a cross-sectional study. *BMC public health, 14*(1), 1-12.

Weber, K. (2015). MEESTAR: Ein Modell zur ethischen Evaluierung sozio-technischer Arrangements in der Pflege-und Gesundheitsversorgung. In M. Martin, *Technisierung des Alltags - Beitrag für ein gutes Leben* (pp. 247-262).

Weisel, K. K., Fuhrmann, L. M., Berking, M., Baumeister, H., Cuijpers, P., & Ebert, D. D. (2019). Standalone smartphone apps for mental health—a systematic review and meta-analysis. *NPJ digital medicine, 2(1)*, 1-10.