Promotion of Wellbeing in Japanese Culture using Positive Computing

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***Abstract*—Many Japanese tend to associate mental health issues with a weak personality, which leads to people hiding their problems and avoiding help-seeking. Thus, this paper presents user research and design of a smartphone application tailored to people with a Japanese background that promotes wellbeing using positive psychology, focusing on positive feelings and events as well as methods to increase positive emotions. To this end, a narrative literature review has been conducted on mental health in the Japanese context and positive computing/positive psychology, which was followed by five qualitative interviews with participants with a Japanese background living in Europe. The literature review and interviews resulted in 24 design implications (12 for each step), and a high-fidelity prototype for an application to foster mental wellbeing through self-help.**

Keywords- ***wellbeing; Japanese culture; positive computing; mental health app; qualitative user research***

I. Introduction

Mental health tends to viewed as a taboo topic by the general public in Japan, where people tend to believe that mental health concerns are the effect of a weak personality instead of a real health issue [1]. Showing mental health symptoms is also highly associated with feelings of shame due to concerns to be perceived as weak by other people or the community in general [2]. The consequence of this concern is that people tend to avoid seeking help from friends, family or professionals and prefer to handle their problems on their own [3]. While much psychological research applied in Human-Computer Interaction (HCI) is tailored to Western contexts, people with other cultural backgrounds also live in Western contexts like Europe, where they often use technology designed with Western values. Therefore, taking views of users with Japanese background into account when designing digital interventions for mental wellbeing could be beneficial.

The aim of this paper is to present a concept for a smartphone application that promotes mental wellbeing for people with a Japanese background living in Western contexts with the idea to focus on self-help and interventions to be carried out alone for people who avoid help seeking. For this, suitable practices from positive psychology [4] were integrated in the conceptual application, in particular gratitude and humor interventions. Furthermore, qualitative interviews with five participants with a Japanese background living in Europe were conducted to specify the concept and requirements in detail.

This paper is structured as follows. In Section II, we present the approach and methods used, including a narrative literature review and qualitative interviews to gather data, and a short description prototype implementation procedure. Results of the literature analysis are presented in Section III, followed by the interview results in Section IV. The final design requirements and the concept are then presented in Section V. Section VI discusses the outcome and limitations of the research, followed by the concluding Section VII.

II. Methods

The identification of requirements and implementation of the prototype was conducted in three phases: (1) narrative literature review, (2) qualitative interviews, and (3) concept and prototype design. From the literature review, we pulled out a set of design implications (see Table I). These formed the basis for defining questions for the qualitative interviews (see Table II). Extensions and adjustments were made to the design implications after gathering insights from the interviews. Based on these results, a high-fidelity prototype of a smartphone application was created.

A. Phase 1: Literature Review

Research papers for following areas were relevant for this work: perception of mental health in Japanese society (including stigmatization and causes of stigma), positive psychology & positive computing (including a general outline and its focus on Western contexts, gratitude interventions, humor interventions), and user engagement and motivation (including the use of chatbots & avatars for promoting wellbeing). Several journals and conference proceedings were screened for searching papers: Human-Agent Interaction (HAI), Human-Computer Interaction (HCI), PubMed, and JStage specifically for Japanese papers. Keywords used in literature search were combinations of the following: Japan, mental health, perception, stigma, mental wellbeing, cultural, positive psychology, positive computing, intervention, gratitude, humor, chatbot, woebot, avatar, gatebox as well as variations of the above words. In total, 43 papers were reviewed. The papers and topics were clustered and analysed using the *Miro* software.

B. Phase 2: Qualitative Interviews

Five qualitative interviews were conducted with students with a Japanese background living in Europe, who were all acquired through a common acquaintance. These interviews were hold as online video conferences through Jitsi or Zoom using English for communication. The format was a semi-structured interview using an interview guide containing questions that addressed how participants personally deal with negative emotions, their perception of gratitude and humor interventions and their impressions of digital mental health companions, in particular the application Woebot and avatars for chatbots, in particular the device Gatebox. Furthermore, presentation slides were used during the interview as an addition to the questions for showing pictures and videos. The interviews were video-recorded and semi-transcribed as interview notes in the next step. Reflexive thematic analysis [5] was conducted to identify themes across the data.

C. Phase 3: Prototype Implementation

For the concept, a high-fidelity prototype was created to depict the resulting design implications. First, the prototyping tool *Figma* was used to build the design of different smartphone application screens, which were then exported to the prototyping tool *Protopie* for implementing interactivity and logic functionality allowing the prototype to react to user input.

III. Literature Review

To inform requirements from previous research, a narrative literature review was conducted. The results will be presented in the following, covering the topics *A. Perception of Mental Health in Japan*, *B. Positive Computing*, and *C. User Engagement and Motivation*.

A. Perception of Mental Health in Japan

1) Stigmatization: Mental health topics such as depression, schizophrenia and suicide are still heavily stigmatized in Japan and seen as a taboo [1]. Moreover, there tends to be a lack of awareness regarding mental health in general, as many Japanese (1) do not believe in the effectiveness of treatments or in a high chance of recovering, or/and (2) blame the weakness of one's personality or lack of willpower as the cause of mental health issues [1], [2], [6].

This mindset leads to the problem that people who suffer from mental health issues often feel shame and self-criticism for their concern and do not seek help from family, friends or professionals [2], [7]. People tend to avoid talking to other people about their problems due to the fear to be perceived as weak by others, which can result in feeling the need for social isolation [3], [8]. Additionally, acquaintances of people with mental illnesses even tend to socially distance themselves from a person who is affected by a mental condition, especially those with a closer relationship [1].

2) Cause of Stigma: Possible factors that have been studied to potentially have an influence on stigma towards mental health conditions. There are individual factors, such as socio-demographic data like age and gender, as well as socio-economic data such as education and occupation. Moreover, knowledge and familiarity of mental illnesses could also be influencing factors, as well as if a person knows or has been in contact with other people with mental illnesses [9]. Ando et al. [1] have also stressed that missing knowledge contributes to stigma. Apart from this, there is a lack of provided education and national programs in Japan to help tackle incorrect knowledge about mental health issues and provide insights from latest research. Then, there are communal factors, such as the social capita which is, e.g., composed of social networks, trust or relation between people that create a shared believe and social rules among the community [9]. Some also see cultural factors as a cause of negative mindset towards mental problems and emphasize that the norms in Japanese culture and community lead to such attitudes [2], [10]. In general, mental health issues tend to be seen as a topic to avoid in discussions, and individual feelings tend to be disregarded or hidden [1], [11]. A study further showed that people were aware of the presence of their mental health issues, however lacked knowledge about solutions for their problem and countermeasures [11]. Research further suggests that people in Japan tend to feel more comfortable with implicit support, contrary to the preference for explicit support in Western contexts [12].

B. Positive Computing

1) Fostering Wellbeing in Western Contexts: In recent years, the idea to promote happiness and well-being of humans through computer-based technologies grew increasingly in the HCI community. This led to the emergence of the area of positive technology or positive computing, which is a interdisciplinary field of two studies: HCI, which concerns itself with the incorporation of a human-centered approach in the design process of ICT applications and positive psychology [13], [14]. The study of positive psychology aims to identify and understand positive emotions, positive character and finding ways to increase them, as well as the institutions that enable their flourishing [15]. Thus, the design of strategies or so-called interventions to foster positive feelings is one of its key aspects [16]. As a result, positive technology consists of a theoretical pillar, that develops concepts and frameworks to integrate positive psychology into technology and a methodological part for the design, implementation and evaluation of applications to enhance positive affect [14]. To foster wellbeing in and through technology, determinant factors and strategies for improvement can be used, which showed a direct impact on humans wellbeing. Higher level of these factors also result in higher levels of wellbeing. Some identified examples for determinant factors are positive emotions, self-awareness, mindfulness, gratitude, compassion [4].

However, positive psychology is strongly influenced by Western or more precisely, North American mentality, which

has been criticized often [17]. As Western countries developed a more individualistic cultural mindset, researched interventions and strategies tend to focus on improving individual wellbeing, which are not ideal to implement and may not be as effective for users with collective background that sets great value on the community and how the individuals can contribute to the whole [18].

Due to the above stated cultural influences in the state-of-the-art interventions of positive psychology and the importance of incorporating cultural aspects when developing applications to foster wellbeing, our approach will take characteristics of Japanese culture and perceptions of users with a Japanese background on mental health conditions into consideration. We argue that even for people with Japanese background living in in Western contexts, this could be beneficial. Target users tend to avoid talking about personal problems and seeking help from friends, families or professionals, and they may even feel guilt for receiving social support [12]. Therefore, our approach is to focus on interventions and strategies not based on social factors but instead on self-help, self-care or anonymous interventions.

2) Interventions using Gratitude: Gratitude has been listed as one of the top character strengths that have been robustly and consistently related to life satisfaction [19]. Thus, interventions focusing on gratitude have been developed and seem to be promising for increasing the level of wellbeing and happiness as well as for reducing negative feelings [20], [21]. In long-term studies, it has been reported that practicing gratitude gives good results in improving mood, such as in the work of Seligman et al., in which their participants were asked to complete the three good things intervention over a duration of six months. This intervention requires to think of three good things at the end of every day that occurred on that day and write them down. They were also asked to describe the cause of the good thing. After one month positive effects could be seen: participants reported higher levels of happiness and lower levels of negative feelings [15].

However, multiple studies investigated gratitude practices in a cultural context, partly comparing two groups of different cultural backgrounds and reported that participants from East Asia are not as positively affected from the interventions as those from Western cultures due to their collectivist culture [22]–[24]. Although it can lead to a decrease in negative emotions, gratitude had no significant influence on positive emotions and wellbeing [22]. Though, one common aspect of the named papers is that they defined gratitude in relation to other people, e.g., being thankful for others or for the action of others. Though, there are also studies that do indicate the effectiveness of gratitude exercises for Japanese users, such as one conducted by Otsuka et al., which reported that practising gratitude is beneficial for increasing positive affect and happiness among Japanese workers [25].

Although there are several studies that show a low compability of gratitude interventions to improve wellbeing in collectivistic societies, such as Japan, this work will still incorporate gratitude strategies. As highlighted, often times gratitude only refers to showing thankfulness to other person or even directly communicating one's thoughts of gratitude to a recipient (gratitude visit), which could also cause negative feelings. Nevertheless, gratitude can also be defined much broader, e.g., as gaining awareness of the good things in one's life, being thankful for them and taking time to show thankfulness [19].

3) Interventions using Humor: The idea to put the character strength humor into use to promote wellbeing and the relation of these two factors have been explored in multiple studies, e.g., [26], [27] and others which were named by Ruch and McGhee [28]. The respective studies showed evidence in favor of using humor interventions, as a high level of humor seems to be in accordance with higher levels of wellbeing and less negative emotions [28]. According to [29], there are different ways to attain happiness with one them being based on hedonism, which means to increase the amount of pleasure while decreasing the amount of pain as much as possible. The trait with the highest correlation to pleasure in life has been shown to be humor [29].

One example of a specific intervention using humor is the adaption of other interventions, e.g listing three funny things instead of the traditional three good things, as seen in Gander et al.'s work, which additionally used the adapted intervention in an online format [26]. The participants were instructed to think of three funny things that happened for each day and note them. In contrast to a placebo control group, the humor intervention group showed an increase in happiness as well as a decrease in negative feelings. In another study [27], the following intervention strategies showed to be effective to increase feelings of happiness: (1) counting the amount of funny things happened on the day and writing down the total number, (2) applying humor to daily life meaning to be more aware to humorous experiences and notice them but also incorporating humorous activities, such as reading jokes, enjoying comedy movies or books (3) and the before mentioned three funny things a day intervention. Tsukawaki et al. [30] studied the relation between wellbeing and different types of humor. Both adults and children who belong to the type with a self-defeating humor interestingly showed the highest level of wellbeing compared to the other humor types playful and aggressive humor. Further, Tsujita and Rekimoto investigated how forced smiles using technology could improve the mood of participants, namely through smile therapy. The effects of technology-induced smiling showed positive effects on feelings of happiness when tested on a small participant group [31].

C. User Engagement and Motivation

One concern of digital psychology interventions is that an online intervention can only be effective when it is used by users. Therefore, one important aspect is to achieve user commitment and creating enjoyment, which raises the questions how to (1) make users choose an application, (2) get users to engage with it, and (3) motivate users to keep using the application [32]. Equipping the online intervention with a

chatbot and an avatar may present potential methods to raise user experience.

1) Chatbots: Chatbots are used in many sectors and have also found its way into psychology. One of them is a smartphone application called Woebot, which uses a conversational agent combined with researched psychology techniques to help people to overcome negative thoughts and feelings, deal with stress and anxiety and improve their mood [33]. This is done by checking in with the user on a daily basis, and recommending different interventions based on their personal problems. Another aim of the application is to build rapport with users through a human-like technology that shows empathy and thus improving the efficacy of the interventions, which has been noted as a factor that other digital solutions to improve mental wellbeing [34]. Positive reviews in the app store reported that, e.g., using it felt very personal, helped reduce their anxiety, but also that users felt support when they couldn't talk with other people about their problems and emotions and did not feel judged about their feelings by the chatbot [35], [36].

2) Avatars: In recent years, the exploration of avatars in mental health strategies has been increasing and lead to promising results when used, e.g., in interventions for improving mental wellbeing, reducing anxiety, and lessen depressive symptoms [37]. There are multiple ways to integrate an avatar, such as for representation of the client in online therapies in a virtual space, the support of interventions in face-to-face therapy or as autonomous virtual therapists. The latter one describes a virtual agent playing the role of a virtual health coach with a graphic representation, i.e., an avatar to embody the coach [38]. Studies that used such avatars reported great efficacy, e.g., for imparting knowledge and promoting self-care [37]. In addition, when technologies combine an avatar with a conversational agent and thus providing a talking avatar, they have a higher potential to build a prolonged relationship with its users and hold a greater appeal and persuasiveness compared to technologies without such components [37].

Some studies also investigated the influence of different types of avatars and suggested that avatars with a similar appearance to the users are more persuasive compared to arbitrary ones [37]. The possibility of personal customization of avatars can additionally increase user enjoyment and support longer lasting engagement with the application [32].

Another way avatars can be differentiated is between realistic representations depicting real people and animated characters. [38]. One example of an animated avatar is the Japanese Gatebox, a virtual holographic-like character that can answer questions and be used as a smart home device [39]. The Gatebox can be compared to other home assistants such as Alexa, Google Assistant and Co, however its aim is to provide emotional support and act more as an virtual companion than an assistant, while imitating a female voice [39], [40].

IV. Qualitative Interviews

To further specify the requirements, five qualitative interviews were conducted. The age of the participants were between 20 and 30, and all the five participants grew up in Japan and have been also living in Europe for several years, e.g., for studies or work. Furthermore, as far as it is known, none of the recruited people have a case of psychiatric diagnosis and are thus cognitively able.

The interviews lasted around 30 minutes, and questions addressed how participants deal with negative emotions, help-seeking, gratitude and humor interventions, the application Woebot and chatbots in general, the product Gatebox and avatars in general. Participants were asked to try out the Woebot application before the interviews were conducted. The results will be presented in the following.

A. Dealing with Stress and Negative Emotions

Participants used a variety of activities to deal with negative emotions, such as listening to music, watching movies or concentrating on work, studies, hobbies or any other activities. One participant also likes to visit their neighbourhood cat to cuddle it to reduce their stress. Furthermore, sleep and alcohol were also listed to be helpful. Thinking positively was also applied, such as one participant explained: "I just tell myself repeatedly 'it will be alright, it will be alright', it's really simple". Another participant also showed a positive mindset, as they said that what happened can not be changed anymore so it is best to try to forget about it and move on.

B. Help-Seeking

Several participants stated they usually avoid asking for help from other people due to them not wanting to bother anybody and having the mindset to need to solve their problems on their own. Moreover, they want to talk about nicer things and do not want to reveal their 'bad side' to others. However, consulting friends and family was also often mentioned as a method participants usually use when they encounter problems. They stated they feel better after talking, can organize their thoughts better and the cause of their stress gets clearer. They also encourage other friends to talk to them if they have problems. One important aspect that has been stated when providing support to other people is to listen to their feelings and to 'accept what they are'. Furthermore, it was emphasized to not provide advice unless the person specifically asks for it. Participants who seek help from other people find it helpful as talking to other people allows them to organize their thoughts and understand their situation or cause of their stress better.

C. Journal Interventions

For the most part, participants could imagine practicing journaling exercises, such as three good things, gratitude, and three funny things as an intervention, and they had good attitudes towards theses interventions. Participants commented that looking back on the support they received made then feel happy or that these exercises could help them focus on good aspects. However, many thought the integration into daily life and forming a habit to write a journal entry everyday would be difficult. In addition, they worried about not being able to recount everything at the end of the day but on the other hand writing down good or funny events every time something happens is not realistic either.

D. Applying Humor

Doing funny activities, such as watching funny movies or reading funny books and comics were in general well accepted by the participants. Nevertheless, there were also concerns that these exercises could have a counterproductive effect, as people may feel they have wasted their time instead of working something important and thus feel more stressed. In addition, the idea of a daily smile camera has been commented as weird and creepy by some participants.

E. General Attitudes towards Chatbots

Regarding the idea to use chatbots as an emotional companion in general, participants had various different views. Although participants believed that writing down their throughts and feelings is helpful for moving forward, they would also not consider using such a chatbot as the first choice but rather as an alternative when they have no one to talk to or only when they feel stressed and get a notification. In that case it may be nice to interact with a chatbot to talk about what is bothering them or get sent some funny content to uplift their mood: 'maybe the chatbot could even recommend some funny videos or photos of cute animals or maybe even flowers to make users feel more relaxed and affect their mind positively or it could propose some activities in order to manage what happened, like keep me talking and thinking about what happened'.

On the other hand, participants also perceived chatbots only as a service that provides information and they wished to interact with an 'objective chatbot', which only replies with information about exercises and tips for shifting the mood and also shows evidence for why they are effective. This was especially mentioned for 'normal times' when participants would not feel negative emotions or stress: 'For normal times I would need some objective information and platform, they can just provide me with information for how to deal with the problem better and tell me it's good to do this exercises'. Another topic that participants would find interesting is seeing some analysis of their own data about mood, stress and emotions. They talked about the chatbot being able to recognize when users are stressed and that users can monitor their own mood patterns and being shown tips to improve their situation.

F. Chatbot Personality

Regarding the personality of chatbots, many participants talked about a calm personality that is friendly and shows empathy. Especially for difficult times, the chatbot should be 'empathic, show understanding and encourage the user', however it should not be 'too emotional' either. It seemed important for the participants that the chatbot listens to their problem and support them to keep talking instead of acting too 'persuasive or aggressive' to provide solutions and answers. On the other hand, some participants also wished for a solution-focused chatbot that can give good advice. It was also mentioned that the chatbot 'should not be too human-like and rather objective to some extent, just for exercise clearly and for tasks or activities'.

G. Attitudes towards Woebot

For the specific chatbot Woebot, the participants did not try out the app for longer than a couple hours, and some did not download it at all. Those who did use the application perceived it as repetitive, as 'it keeps asking the same questions' and suggests users interventions but does not explain them beforehand and thus received as troublesome.

H. Attitudes towards Gatebox

When the participants were asked about their first impression of the gatebox device, many perceived the device as 'weird', 'strange' or even 'creepy', as one person pointed out:'It's creepy because it acts like your girlfriend'. It was also mentioned that they see gatebox as 'nerdy stuff' and something that is targeted towards 'otaku culture', hence it was also often stressed by participants that they 'personally don't need it'. Nonetheless, the general idea of having a virtual character as a companion was accepted and participants could see that for some people it can be very helpful if they feel lonely or have no one to talk to. In that case, the avatar should appear real, as stated in some interviews: 'if they say good morning every day I will get bored and think it is a machine' or 'I would think it is a robot and wouldn't believe its emotional affect, I would think they are not really thinking about me and understanding me'.

I. General attitudes towards Avatars

In the interviews different kinds of avatars were discussed and compared: real person, animated person, non-human, media characters. All participants did not like real human pictures as avatars, as explained in the interviews: 'Real people would be weird, I would feel like who are you', 'I would definitely not like realistic ones, I don't want to talk with them' or 'The realistic avatars are maybe too creepy, it's like a real person in my home'. One participant also expressed that it would feel easier interacting with non-human avatars: 'If it is a real or animated person I would think they're too real, I wanna talk to someone who is not thinking anything, maybe it would be easier to talk because I think they would forget about it next day'. The majority of participants preferred either non-human avatars such as cute animals or some media characters they are familiar with, examples mentioned were, e.g., characters from marvel, animal crossing, favourite actors, mascots from their favourite groups. One participant specifically mentioned 'I can feel more familiar with media characters, with other characters I don't know them. With media characters I can feel or imagine that we are friends'.

1) Frequency: The frequency of engaging in interventions for wellbeing and the willingness to be notified by the application varied greatly from person to person, from daily interaction to notifications only when feelings of stress occur. Some participants noted that it would be bothersome if they get notified regularly and would only use the application when they are in a bad mood. In particular, one participant mentioned that ideally they would only receive a notification

when the application recognizes a high stress level, e.g., through analysis of users mood pattern.

V. Concept

The concept aims to promote mental wellbeing for users with Japanese background, focusing on self-help and selfcare without being dependent on social relationships in order to avoid feelings of bothering others and indebtedness caused by cultural aspects and characteristics of collectivist societies. The concept of a smartphone app has been created based on the literature review and user research. The ideas have been collected into the concept for a smartphone application that integrates psychological interventions.

A. Psychological Interventions

In the literature review, the two wellbeing factors gratitude and humor to increase wellbeing were explored.

Regarding gratitude, the particular intervention named was the 'three good things' practice, which consists of thinking about three good things that happened that day and writing it down at the end of every day. Good results were reported for improving positive affect and reducing negative feelings. Therefore, the application will prompt users to perform the three good things practice on a daily basis. However, the definition of gratitude will not be limited to gratitude towards other people or to the actions of other people (e.g., 'I'm thankful my friend helped me with a problem') and will take on a broader sense: possible gratitude entries are e.g., 'I'm grateful that I could take a walk in the park today', or 'I'm thankful for this movie which I enjoyed'.

One intervention based on the factor humor is a variation of the 'three good things' practice, which has been modified to the 'three funny things' practice. Other effective humor practices are counting the amount of funny things each day, applying humor to daily life and solving stressful events with humor. Additionally, smile therapies have also shown potential to uplift mood and wellbeing, including technology-induced smiling.

Therefore, the application will provide a toolbox of different interventions and prompt users to carry them out regularly. For this, explicit design implications have been derived out of the results of literature analysis and the conducted interviews. Table I and Table II describe the resulting requirements for the application concept based on literature and interviews respectively, the reason for including the requirement and on which section it is referring to.

B. Emotional Support Companion

Similar to the Woebot, an intelligent chatbot will be integrated to guide users through interventions. As target users tend to avoid to seek help from friends and family and prefer to keep problems to themselves, the chatbot should moreover show empathy and embody a companion for emotional support to which users can without social barriers.

In addition, the chatbot will be represented by an avatar to support building rapport with its users, which (1) increases their trust and thus willingness to talk about their problems, and (2), to improve user enjoyment to prolong their engagement with the application and included interventions.

C. Prototype Walkthrough

1) Starting the Application: At the beginning the application displays a starting screen with a character from the game Animal Crossing as an animated non-human avatar. The user is asked how frequent they like to be notified by the avatar or the application, which covers requirement IA11.

2) Home: The homescreen allows the user to access all functionalities of the application: opening the personal journal of the user, saved activities, exploring new or other journal or activity exercises that users can try out. It also depicts the avatar with a message, to which the user can answer. Two buttons at the top of the screen are for recording the current mood and the smile camera to take a photo of the user smiling. Alternatively, a navigation bar at the bottom also leads to the journal, activities, explore page but also to the mood tracker, which shows all recorded mood data of the user.

3) Journal: A daily journal entry can be created for gratitude and humor interventions that involve writing notes such as a gratitude journal or count the funny things exercises, described by requirements LA04, LA05 and LA06 (see Figure 1). However, there is no predefined schedule for any of the interventions, thus letting users fully decide the time and frequency of exercises, which refers to IA01 and IA02 of design implications. Moreover, the journal is flexible and can be extended with preferred journal exercises to make it possible for users to configure their journal entry each time. For example, they can choose to write down three good things only or they can add three funny things and a gratitude journal as well if they feel like it. After saving, changes in the users' mood are tracked.

4) Activities: The activities screen lists all activities saved by the user, i.e. exercises to integrate humor into daily life such as reading a funny book or watching a funny movie. A detailed explanation about these interventions can be displayed, and users can then conduct the exercise according to the given instructions and mark if they have completed an activity, depicting implication LA06. Again, the user is asked about mood changes to track the effectiveness of the intervention.

5) More Exercises: In the explored section, users can slide through different exercises they haven't saved yet and click on one to learn more about the exercise, its effectiveness and instructions. Based on requirements LA03, IA04 and IA06 the application also offers the possibility to learn more about it through a more detailed explanation or by reading through the sources attached in the app. Using the save button, users can add the intervention to their favourites.

6) Chatbot: Users can talk with the chatbot or the avatar if they feel like it. The purpose of the chatbot is to play the role of a virtual friend that users can seek help from at any time. The chatbot reacts to messages of the user and answers in a friendly manner and shows empathy when users talk about their emotions, thoughts and worries. Furthermore,

TABLE I
DESIGN IMPLICATIONS FROM LITERATURE REVIEW

ID	Reason	Section	Implication
LA01	Japanese tend to keep their problems to themselves and avoid talking to other people	Perception of Mental Health in Japan	The app focuses on self-help: interpersonal aspects should not be a requirement for performing interventions (interpersonal interventions are, e.g., thanking another person, social network elements, gratitude intervention focused on other people)
LA02	Lack of education about mental health issues contribute to stigma	Stigmatization	Offer educational content about mental health
LA03	Some people are aware of mental health issues but lack knowledge about solutions and countermeasures	Cultural Comparison	Offer educational content about psychological interventions
LA04	Gratitude interventions may increase positive feelings	Gratitude Interventions	Integrate gratitude interventions as exercises, such as the following: • three good things • up to five things I'm grateful for
LA05	Interpersonal gratitude could cause negative feelings, such as feelings of indebtness and guilt for Japanese	Gratitude Interventions	Do not limit gratitude interventions to interpersonal gratitude
LA06	Humor interventions may increase positive feelings	Humor Interventions	Integrate humor interventions as exercises, such as the following: • three funny things • count the funny things • applying humor to daily life • solving stressful situations with humor
LA07	Taking a picture of oneself with a smile may increase positive feelings	Humor Interventions	Integrate a 'smile camera', which users can use to take a picture of themselves smiling
LA08	A chatbot may improve user engagement	User Engagement and Motivation	Integrate a chatbot, that users can talk with
LA09	A chatbot with empathy may improve user rapport and thus efficacy of interventions	User Engagement and Motivation	The chatbot should act empathic
LA10	Conversational avatars may improve prolonged user relationship and persuasiveness. Avatars may support imparting knowledge and promoting self-care	User Engagement and Motivation	The chatbot should be represented through an avatar (graphic representation)
LA11	Avatars with a smiliar appearance to the users may be more persuasive	User Engagement and Motivation	The chatbot should have a Japanese appearance
LA12	The possibility to customize avatars may improve user enjoyment and engagement	User Engagement and Motivation	Provide the possibility to customize avatars

it aims to uplift their mood through encouraging words, showing understanding, and by sending funny content, such as humorous pictures of animals. Another purpose is to build rapport with the user and improve user engagement to promote their selfhelp. This covers requirements LA08, LA09, IA05, IA07 and IA08.

7) Mood Button: To track the current mood without doing exercises, the mood button can be clicked, which opens a simple pop-up with the avatar asking how the user is feeling.

8) Smile Camera: Requirement LA07 describes possible effects on wellbeing when smiling at a camera. For this, the camera icon navigates to the smile camera, which instructs users to take a picture of themselves while smiling. A picture of a happy smiley is overlaid with the camera to remind users to show a smile.

9) Explore & Learn: In the explore and learn page, users are provided with learning material about mental health and various interventions to improve wellbeing categorised in journal and activities interventions. The icons either open learning content about a specific intervention or topic in the application or links to external material such as blog articles or online videos. Thus, users are offered educational content, as defined in LA02, LA03, IA04 and IA06.

10) Mood Tracker: Finally, the mood tracker screen displays a calendar that shows all mood entries made by the user (see Figure 2). For each day with an entry it is possible to show the tracked mood for the given day and the specific exercises done that day. Based on this information, the application also suggests the top exercises with the highest effectiveness specific for that user. This feature refers to IA12 from the design implications.

VI. DISCUSSION

The aim of this paper is to explore positive psychology to promote wellbeing and self-help for Japanese people living in Europe. While previous research indicates stigmatization

TABLE II
DESIGN IMPLICATIONS FROM INTERVIEWS

ID	Reason	Section	Implication
IA01	It may be a challenge for users to form a habit for daily journal exercises	Journal Interventions	Users should be able to choose the frequency of journal interventions: daily, every second day, every third day or every week.
IA02	Interventions, especially those with longer duration such as watching a funny movie may be perceived as time-wasting for users	Applying Humor	Interventions should not be scheduled as a regular activity
IA03	Participants did not like Woebot‘s repetitive questions and	Woebot	The chatbot should have variety in its dialog
IA04	Participants wished for more explanation before trying out an intervention in Woebot	Woebot	The application should provide information and explanations about interventions before suggesting them to users
IA05	Participants wish to be sent funny content to uplift their mood	Chatbots	The chatbot should not only talk with users, but also show them funny and uplifting content,e .g. funny pictures/videos, pictures of cute animals, pictures of flowers
IA06	Participants wish for a solely informative chatbot for normal‘ times when they are not in a bad mood	Chatbots	User should have the possibility to ask the chatbot for information about exercises, tips for uplifting mood and scientific evidence.
IA07	Participants wish for a calm and friendly chatbot personality	Personality	The dialog of the chatbot should appear calm and friendly.
IA08	Participants wish for a chatbot that shows empathy, understanding and encourages the user	Personality	The chatbot should show empathy and reply with encouraging answers
IA09	Some participants only want to be listenend to while others want to receive advice.	Personality	The chatbot should first ask for user‘s preference to give advice
IA10	Participants preferred non-human avatars or media characters	Avatar	The chatbot should be represented by a non-human avatar or media character
IA11	Participants may feel bothered by frequent notifications	Frequency	The application should ask users about their preferred frequency of notifications: multiple times a day, daily, every couple days, weekly
IA12	Participants wish to see analysis of their mood, stress and emotions	Chatbots	The application should provide analysis for a user‘s mood, stress and emotions

of mental health in Japan [1], [2], [6], HCI research and wellbeing tends to be focused on users from Western contexts.

The prototype presented in this paper is a result of both design implications from a narrative literature review and views expressed by interviewees with Japanese background, implementing gratitude and humour interventions, and in addition, implementing a chatbot to provide companionship and engagement.

Through the interviews, it could be seen that participants needs were very diverse (also found previously with other user groups, e.g., [41]), in particular, regarding the idea of a chatbot that embodies a virtual companion. Some interviewees found the chatbot aspect unnecessary and preferred a solely informative application to access knowledge about different positive psychology interventions without the need to communicate with a chatbot. Other participants showed a high interest in a virtual companion which they can share their thoughts, feelings and problems with. As also proposed for the design of other devices and use cases (e.g., [42], [43]), this indicates the need for a personalised application to promote wellbeing.

Some participants initially rejected the idea of an avatar stated that they would perhaps think differently about it when they actually feel stressed or other negative emotions. It can be difficult to imagine how they would feel in different moods. Therefore, flexibility of the application is certainly needed.

It was also mentioned that notifications should not appear frequently, but only when needed, e.g., when the user feels stressed. Ideally, the application would be able to recognize mood changes of the user in real-time and only then send a notification. This would require additional solutions, for example, incorporating the use of wearables that are able to identify bad mood through biosignals [44]. Another approach could be the use of articifial intelligence to recognize patterns or seasons in mood data.

During the interviews, the device Gatebox was shown and explained, however it was not well received by some participants and it was often stressed that they personally do not need the the device. This may be because the target group of gatebox seems to be otakus, which is a term with a negative connotation referring to people highly interested in popculture such as manga, anime or video games including featured virtual characters [45]. Therefore, there is a possibility that participants talked about chatbots and avatars in association with gatebox and otaku culture and perceived them as more negative, thus stressing that they do not want to talk to a virtual companion or human-like avatars.

Not all requirements could be depicted through the prototype. Especially implications for a chatbots dialog were not

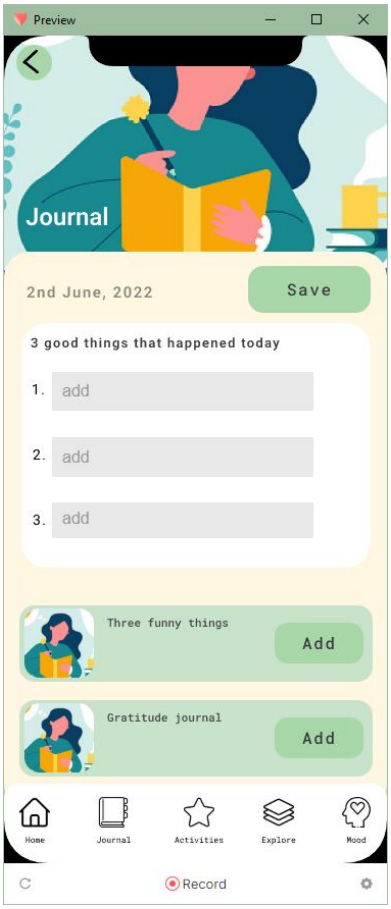

Fig. 1. Journal Exercises

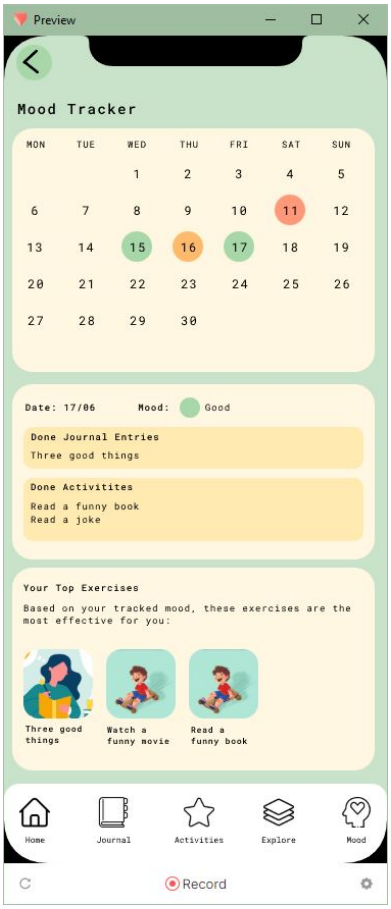

Fig. 2. Mood Tracker

built into a high-fi prototype, such as offering a variety in answers of the chatbot (IA03). Another requirement based on literature was omitted as it contradicted with the interview results: according to previous research, integrating avatars with a similar appearance to users seems to lead to a higher persuasiveness [37]. However, most interviewees stated that they prefer a non-humanlike avatar. This confirms the need to conduct research grounded in case studies [46], [47], and furthermore, at least one additional step of evaluating the prototype should be considered in future work.

There are several limitations to be mentioned. We recognize that Japan is a large country with a high diversity in cultural values and mindsets, which could not be discussed in-depth in this paper. Due to the language barrier, there is the possibility that the literature analysis is missing relevant papers in Japanese language. Furthermore, the interviews were conducted on a smaller scale, and thus interviews with more participants would be useful to obtain more enrich the results in a follow-up step, and including also an evaluation.

VII. Conclusion

In this paper, a prototype for a smartphone application was implemented with the aim to promote mental wellbeing for people with Japanese background living in Europe. As stigma is still prevalent regarding mental health issues in Japanese society, people tend to avoid help-seeking and deal with problems on their own. Therefore, this prototype should provide a tool for self-help and to improve wellbeing through the use of positive psychology. Although a great amount of research regarding positive psychology has been done, it has been mainly tailored to individualistic cultures. This work also aimed at exploring the suitability of positive computing for people for collectivistic cultural backgrounds like Japan, considering its suitability while designing the prototype. Interviews were conducted to specify design implications in detail. Moreover, the usage of chatbots and avatars has been explored and integrated into the application, representing a virtual companion that users can talk with and seek encouragement from. At the same time, the application offers journal exercises and activities to increase positive mood and in addition educational content about mental health and methods to deal with negative emotions. An evaluation of the prototype was not conducted and is something to consider in future work. Also, the integration of wearables or machine learning for automatic mood identification may be an interesting addition. Certainly, more research is needed to diversify the knowledge on positive psychology interventions when it comes to target users with more diverse cultural backgrounds.

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