DESIGN FOR POSITIVE SELF-HELP INTERVENTION EXPERIENCE WITH THE INVESTIGATION OF MEDITATION-ORIENTED MENTAL HEALTH APPLICATIONS

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

YAĞMUR MERVE ARIK

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF SCIENCE
IN
INDUSTRIAL DESIGN

APRIL 2020

Approval of the thesis:

DESIGN FOR POSITIVE SELF-HELP INTERVENTION EXPERIENCE WITH THE INVESTIGATION OF MEDITATION-ORIENTED MENTAL HEALTH APPLICATIONS

submitted by **YAĞMUR MERVE ARIK** in partial fulfillment of the requirements for the degree of **Master of Science in Industrial Design, Middle East Technical University** by,

Prof. Dr. Halil Kalıpçılar
Dean, Graduate School of **Natural and Applied Sciences** _____

Prof. Dr. Gülay Hasdoğan
Head of the Department, **Industrial Design** _____

Prof. Dr. Gülay Hasdoğan
Supervisor, **Industrial Design, METU** _____

Examining Committee Members:

Assist. Prof. Dr. Gülşen Töre Yargın
Industrial Design, METU _____

Prof. Dr. Gülay Hasdoğan
Industrial Design, METU _____

Assist. Prof. Dr. Sedef Süner-Pla-Cerda
Industrial Design, TED University _____

Date: 13.04.2020

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Surname: Yağmur Merve, Arık

Signature:

ABSTRACT

DESIGN FOR POSITIVE SELF-HELP INTERVENTION EXPERIENCE WITH THE INVESTIGATION OF MEDITATION-ORIENTED MENTAL HEALTH APPLICATIONS

Arık, Yağmur Merve
Master of Science, Industrial Design
Supervisor: Prof. Dr. Gülay Hasdoğan

April 2020, 154 pages

No matter how busy life is, it is important to take a few minutes breaks to slow down, regulate the rhythm of breath, nourish the body, and clear the mind through an effective mind-body exercise. Meditation, as a self-help mind-body exercise, provides various solutions to several problems arising from diverse conditions. As technology developed, forms of self-help interventions have been changed. Especially mobile health technologies that have been combined with various traditional practices became more powerful and effective. Mobile health self-help interventions intend to enhance well-being by supporting individuals in both physical and mental health issues. In parallel with this purpose, strategies that can be used in the development and improvement of these interventions should be investigated with a holistic approach by taking into account many different contexts. The aim of this study is to provide recommendations on the design and development of meditation oriented mHealth technologies that aim to offer a positive self-help intervention experience. For this reason, a three-phase study was carried out with the participation of 15 people through three selected meditation apps. The first phase consists of semi-structured interviews, the second phase consists of online diary methods, and the last phase consists of semi-structured

interviews. As a result, strengths and weaknesses of current meditation apps were analyzed, characteristics of the meditation experience that are practiced through mobile technologies were identified, and principles of positive psychology that can be applied in the design of meditation apps were decided. Along with that, various design suggestions have been provided to enhance the positive mHealth app experience.

Keywords: Meditation, Mobile Health, Positive Psychology, Self-Help Technologies, User Experience

ÖZ

MEDİTASYON ODAKLI ZİHİNSEL SAĞLIK UYGULAMALARININ ARAŞTIRILMASI İLE POZİTİF KENDİNE YARDIM MÜDAHALELERİ DENEYİMİ TASARIMI

Arık, Yağmur Merve
Yüksek Lisans, Endüstri Ürünleri Tasarımı
Tez Yöneticisi: Prof. Dr. Gülay Hasdoğan

Nisan 2020, 154 sayfa

Hayat ne kadar yoğun olursa olsun, etkili bir zihin-beden tekniği aracılığı ile yavaşlamak, nefes ritmini düzenlemek, vücudu beslemek ve zihni temizlemek için birkaç dakikalık aralar vermek önemlidir. Bir kendi kendine yardım zihin-beden egzersizi olarak meditasyon, bireylere farklı koşullardan kaynaklanan çeşitli sorunlar için çözümler sunar. Teknoloji geliştikçe kendi kendine yardım müdahalelerinin formu da değişti. Özellikle çeşitli geleneksel uygulamalarla birleştirilen mobil sağlık teknolojileri daha güçlü ve etkili hale geldi. Kendi kendine yardım odaklı mobil sağlık müdahaleleri, bireyleri hem fiziksel hem de zihinsel sağlık konularında destekleyerek refahı artırmayı amaçlamaktadır. Bu amaca paralel olarak, bu müdahalelerin geliştirilmesi ve iyileştirilmesinde kullanılabilecek stratejiler, birçok farklı bağlam dikkate alınarak bütünsel bir yaklaşımla araştırılmalıdır. Bu çalışmanın amacı, pozitif kendi kendine yardım müdahale deneyimi sunan meditasyon odaklı mobil sağlık teknolojilerinin tasarımı ve geliştirilmesi konusunda öneriler sunmaktır. Bu nedenle, 15 kişinin katıldığı üç aşamalı bir çalışma, seçilen üç meditasyon uygulaması üzerinden gerçekleştirilmiştir. Çalışmanın birinci aşaması yarı yapılandırılmış görüşmelerden, ikinci aşaması çevrimiçi günlük araştırma yöntemlerinden ve son aşaması yarı yapılandırılmış görüşmelerden oluşmaktadır. Sonuç olarak, meditasyon

uygulamalarını güçlü ve güçsüz yönleri belirlenmiş, mobil teknolojiler aracılığıyla uygulanan meditasyon deneyiminin özellikleri tanımlanmış ve meditasyon uygulamalarının tasarımında faydalanılabilecek pozitif psikolojinin ilkelerine karar verilmiştir. Ayrıca, pozitif mobil sağlık uygulaması deneyimi arttırmaya yönelik tasarım önerileri sunulmuştur.

Anahtar Kelimeler: Kendi Kendine Yardım Teknolojileri, Kullanıcı Deneyimi, Meditasyon, Mobil Sağlık, Pozitif Psikoloji

To deep passions and endless dreams

ACKNOWLEDGMENTS

First and foremost, I am sincerely and heartily grateful to my advisor Prof. Dr. Gülay Hasdoğan, for her endless support, encouragement, criticism, and assistance throughout my study. I am thankful for her valuable insights, inspiring advice, understanding, and effort for the completion of this thesis. It was a great chance to be supervised by her. Without her guidance and understanding, it was honestly impossible for me to do this research.

I am thankful for the members of the thesis committee; Prof. Dr. Gülay Hasdoğan, Assist. Prof. Dr. Gülşen Töre Yargın and Assist. Prof. Dr. Sedef Süner-Pla-Cerda for their valuable time, feedbacks, and suggestions.

Besides, I would also like to thank all the members of the Department of Industrial Design at Middle East Technical University for their kindness and support during my Master's Degree.

I would also like to thank all the participants involved in the interviews and diaries for allocating their valuable time for participating in the study.

I would like to thank all my dear friends for their endless encouragement, support, and friendships. Especially for Doğa Balkanlı for being such a good friend by motivating me all the time and Tuba Uludağ for helping me to continue in hardest times and always make me laugh in any condition. I feel fortunate to have them.

Lastly, and most importantly, I would like to express my sincerest thanks to my family, my mom, my dad, and my brother for their endless love, patience, and support in my whole life. Their presence has always been the most significant source of my motivation. Especially, I am very lucky to have my mom by my side in every decision I made. I am grateful for her love and unlimited support.

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CHAPTER 1

INTRODUCTION

1.1 Problem Definition and Background

"It's not stress that kills us; it is our reaction to it."

(Selye, 1956)

Upcoming deadlines, fear of unemployment, economic insecurities, social life problems, health problems, busy lifestyles, extreme work pressure, and many other problems make stress an inevitable part of everyday life (Kaipainen, 2014; Nehra, Nehra & Dogra, 2012). One broad definition of stress, which is a very complicated topic, is "it is physical, mental, or emotional reaction resulting from an individual's response to environmental tensions, conflicts, pressures, and similar stimuli" (Newbury-Birch & Kamali, 2001, p.109). Stress affects individuals physically and mentally negatively. In order to keep the individual healthy and get rid of these effects, sufficient daily recovery is vital. For this, individuals should benefit from healthy coping strategies (Kaipainen, 2014). There is a strong link between high stress levels and unhappiness (Walsh & Lyubomirsky, 2017).

The pursuit of happiness has been the subject of human interest for centuries and has been cited as the ultimate goal of humanity (Feldmann, 2017; Pohlmeyer, 2012). According to psychologists, happiness or unhappiness is not innate to people; in fact, they build their happiness with specific strategies (Ruitenberg, & Desmet, 2012). Happy people are more social, active, creative, productive, and successful in many areas of life compared to unhappy people. They have strong immune systems, better conflict skills, better cognitive abilities, and healthy relationships. They demonstrate successful prosocial behavior, love themselves and

other people, and contribute more to their communities (Desmet & Hassenzahl, 2012; Desmet, 2012). As a result, happiness has significant importance on for both physical health and mental health (Feldmann, 2017).

As defined by the World Health Organization (WHO, 2013), mental health "is not just the absence of mental disorder; it is a state of well-being". Mentally healthy people can deal with stressful situations; they work effectively, pursue a fulfilling life, shape strong social relationships, make rational decisions on many topics, and contribute to the community (Nehra, Nehra & Dogra, 2012; WHO, 2013). According to the studies, in which many diseases were examined, mental health problems constitute an important part of the general disease burden (Fundamental Facts about Mental Health, 2015). In fact, according to WHO estimates, one of every two people will have various mental health problems, and mental health problems will be the leader among the most critical health problems in 2030. Despite all these, there is very little investment in mental health problems worldwide (Chisholm et al., 2016). However, supporting, maintaining, and improving mental health is very important for individuals and communities (WHO, 2013). Solutions to be used in the early period can prevent many more harmful problems in the long run (Hermano& Stewart, 2014). According to various studies, some cognitive and behavioral strategies classified as positive interventions can enhance happiness, mental health, and well-being (Howells, Ivtzan&Eiroa-Orosa, 2014). These interventions aimed at enhancing positive feelings, positive behaviors, or positive cognitions through various training, exercise, and therapy methods (Desmet &Sääksjärvi, 2016). Meditation is one of these strategies (Nehra, 2012). Although meditation has hundreds of years of history, it has only recently been accepted as a secular technique and has been used in many contexts (Schmidt, 2014). The primary reasons for the popularization of meditation can be shown as finding solutions for many mental problems without any medication, being easily applicable without requiring expertise, and adapting to daily life (Parks &Titova, 2016).

When looking at the individuals that suffer from mental health problems, they generally do not receive any professional support (Giota & Kleftaras, 2014). There is also a large "mental health gap" worldwide, which means a lack of access to health services for people who need mental health care but have limited opportunities to find evidence-based resources (Muñoz, 2010). For this reason, self-help interventions have gained great importance. With the development of technology and the spread of the Internet, self-help interventions have become more diverse (Matcham et al, 2014). One of the most widely used self-help interventions are mHealth technologies. These interventions consist of a mixture of self-help interventions and mobile devices (Feldmann, 2017). WHO (2011) defines mHealth as “medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants and other wireless devices”. MHealth technology has accelerated with the use of the app, and thousands of downloadable self-help applications have been developed. However, in 2012, a study examining the Health and Fitness category in the Apple Store concluded that there was a comprehensive lack of theoretical structure in applications. When 40 physical activity and diet applications in the same category were examined in 2014, the same results were obtained. In addition, many different reports have emphasized that the applications to be developed in the field of health should be based on evidence-based strategies (Voth, Oelke, & Jung, 2016). To understand the importance of mobile devices and mHealth technology, some up to date data can be listed as follows; the number of smartphone users in the world is 3.5 Billion by 2020. These users had 2.57 million apps that they could access with Google Play and 1.84 million apps that they could access with Apple Store in 2019. In the same year, users downloaded a total of 204 billion mobile apps. According to numbers, 41,377 apps on Google Play and 44,384 apps on Apple Store are health apps. When looking at the most downloaded of these health applications, it is seen that the meditation apps are one of the top ones (The Statistics Portal, 2020).

In recent years, numerous meditation apps have been created in the mHealth category. This has made mental health care available to individuals and reduced the

mental health gap. However, the number of academic studies evaluating these technologies is limited (Roquet & Sas, 2018). In a study published in 2019 aimed at reviewing and analyzing mindfulness research in HCI, 38 papers related to mindfulness and meditation were selected, and they were examined in terms of definition, motivation, practice, evaluation, and technology use around mindfulness. The most popular technologies investigated in the studies are virtual reality (VR) systems, then mobile applications, and tangibles. In these studies, mostly the quality of the meditation, relaxation level, changes in stress, and attention were tried to be measured. Some studies have also focused on the relationship between mindfulness and performance. Among the articles reviewed, 15 were related to facilitating, enhancing, or mimicking meditation with the technology. Various feedback methods used during these studies are self-reporting questionnaires, sensing technology to gather bio-feedback or neuro-feedback such as Electroencephalogram (EEG), heart rate, respiration or skin conductance, and also some studies measured physical indicators (Terzimehić et al., 2019).

Academic studies in this field provide the opportunity for users to reach apps created based on a theory. Theory-based guidelines can be created by making use of the existing theories and concepts from various disciplines such as psychology, health, design, and HCI. These disciplines help to understand individuals and their expectations and also related technologies. Thus, apps can be developed based on valid theories and concepts from these disciplines.

This study focuses on the need to develop theory-based guidelines that can be used in the design and development of meditation applications, which are mental health and well-being targeted self-help interventions.

1.2 Aim and Research Questions

The aim of this study is to propose recommendations on how to design and develop meditation oriented mHealth technologies that aim to provide better mental health

and well-being through the investigation of current apps for enhancing positive self-help intervention experience.

The main research question and supportive sub-questions that were formed in accordance with this aim as follows;

- *What are the design recommendations to be adopted in the design of mHealth apps that focus on meditation?*

  - What are the strengths and weaknesses of current meditation apps?
  - What are the characteristics of the meditation experience that are practiced through mobile technologies?
  - Which characteristics of the meditation apps help to enhance positive experiences?
  - What are the principles of positive psychology that can be applied in the design of meditation apps?

1.3 Structure of the Thesis

This thesis consists of five chapters. These chapters and their contents were briefly described below.

Chapter 1 is the introduction part. It comprises of the problem background of the thesis, its aim and research questions, and the structure.

Chapter 2 is the literature review part. It includes positive psychology, meditation, and positive approaches in technology design in order to understand the necessary theories, technologies, and also the fundamentals of the meditation apps.

Chapter 3 is the methodology part. This section explains data collection methods, recruiting of sampling group selection of mobile apps, procedure, and data analysis.

Chapter 4 is the findings part. In this chapter, the results of the field study, demonstration of the comprehensive findings, and important intersection points with the literature review are presented.

Chapter 5 is the conclusion part. This chapter includes the presentation of the research questions' answers, the limitations of the study, opportunities for further research, and contributions of the study.

CHAPTER 2

LITERATURE REVIEW

The literature review chapter begins with positive psychology and continues with positive psychology interventions to understand the concepts and theories related to well-being, happiness, and flourishing. Then the chapter continues with meditation practice, which is the core subject of the study and a positive psychology intervention strategy. This section includes a review of traditional and secular forms of meditation. The literature review chapter ends with the technology and design-oriented approaches based on positive psychology such as positive technology, positive computing, positive design, and positive user experience.

2.1 Positive Psychology

Approaches of the psychology have often been concerned with the pathological conditions people face and they have given priority to treating illness (Seligman & Csikszentmihalyi, 2000). This perspective continued until positive psychology, a branch of psychology, brought a new field of study to psychology. In 1998, with his study named positive psychology, Martin Seligman shifted the focus of psychology from disease healing to enhancement of people's lives and human thriving (Kumar & Vohra, 2017). After that, psychology has become an approach that deals with human strengths and virtues as well as their illnesses, fails, and losses; now, psychology is interested not only in correcting the wrongs but also finding solutions to improve the rights. Furthermore, after the contribution of positive psychology to the discipline, psychology has become more involved in human life by dealing with things such as people's job, their education and social life (Lopez & Snyder, 2011). Thus, it can be said that positive psychology played a

complementary role and fulfilled the missing aspects of psychology (Seligman, 2011).

Positive psychology is a scientific approach that explores what makes life worth living, tries to find elements that "make normal life more fulfilling", and thereby enhances the flourishing of people, institutions, and societies (Huppert & Johnson, 2010; Nehra, Nehra & Dogra, 2012). Positive psychology does not ignore the negative and upsetting part of life, on the contrary focus on another aspect where research is relatively less for more holistic research (Desmet & Pohlmeyer, 2013). It is essential to be conscious of the capabilities of individuals and develop them to enhance their lives. This awareness supports not only personal development but also the advancement of the community. According to positive psychologists, two different methods can be used for increasing positive human functioning. The first one is to try to eliminate the damaging things in life and the second one is to promote beneficial ones (Nehra, Nehra & Dogra, 2012). The fundamental purpose of positive psychology is increasing happiness. Studies in the field of positive psychology demonstrate that happiness may not come from birth but implementing some tactics makes people happier. Moreover, researchers claim that this happiness can be permanent (Pohlmeyer, 2017; Ruitenberg & Desmet, 2012). According to Desmet and Hassenzahl (2012), to explain why happiness is such a substantial subject, the success of happy people in many fields of life can be shown as an example. They generally have a more active social life, they are physically and psychologically healthier, and they have better problem-solving abilities. They also contribute to the societies that they live in many different areas.

Seligman and Csikszentmihalyi (2001) examined the study areas of *positive psychology* at three different levels i.e. *subjective, individual, and group level.* Subjective level focuses on positive experiences, well-being, and satisfaction for the past subjective experiences, happiness, flow, and pleasure for the present subjective experiences and hope and optimism for the future subjective experience. Individual-level is related to positive characteristics such as the ability of art, social

relationship, artistic perception, creativeness, and mindfulness. Lastly, to be virtuous, to be a good citizen, and to have business ethics are some of the issues at the group level.

Seligman's theory of *authentic happiness* is the early theory of positive psychology (Brey, 2014). According to authentic happiness theory, the main objective of the positive psychology is to increase happiness and measurement of the happiness is "*life satisfaction"* (Seligman, 2010). In the theory of authentic happiness, there are three elements of happiness. These are *positive emotions, engagement, and meaning*. Although adapting all these elements as a whole gives the most effective result, they cannot all be expected to coexist and therefore the elements can be followed separately (Seligman, 2002).

After a while, Seligman has identified some problems that changed his ideas about authentic happiness theory (Seligman, 2010). Firstly, according to the theory, the main focus of positive psychology was happiness but the concept of happiness is highly related to being in a cheerful mood. As an element, positive emotion, core element of the authentic happiness theory, is highly related to cheerful mood. However, there were criticisms about engagement and meaning, which are two other elements of the theory. According to researchers, these two elements have nothing to do with how people feel and cannot be used in the concept of happiness (Seligman, 2011). In the end, Seligman thought it is problematic and he has renewed the main focus as well-being and flourishing (Pohlmeyer, 2012).

According to Seligman (2011), the second problem is life satisfaction as a scale is insufficient to measure happiness. In the theory of authentic happiness, happiness is measured by a scale of life satisfaction used largely in different research areas. This 1- to-10 scale, 1 means terrible and 10 means ideal, measures how satisfied people are with their life. However, it has been revealed that the life satisfaction of the people is specified by their feelings at the time they were asked. This situation unintentionally associates the mood with life satisfaction. Therefore, it was

determined that life satisfaction measured only the cheerful mood and could not measure engagement and meaning (Seligman, 2011).

Thirdly, the basis of the authentic happiness theory is the concept of 'their own sake', and according to this concept, everything people choose must serve only for themselves. The three elements of the authentic happiness theory, positive emotion, engagement, and meaning were suitable for this concept. Some researchers, however, have claimed that people also live for achievement's sake not just for their own sake. Thus, it turned out that the theory should be more comprehensive (Seligman, 2011). Because of this Seligman also revised the elements of authentic happiness theory and he decided that there were new elements that should be added to the theory (Seligman, 2010).

As a result, Seligman renewed his authentic happiness theory by changing its main focus, its scale and adding two new elements that are *positive relationship* and *accomplishment* (Pohlmeyer, 2012; Seligman, 2010). In the next section, the revised theory is explained in detail.

2.1.1 Well-Being Theory

Well-being can be measured by using highly defined methods in contrast to happiness (Seligman, 2011). As Seligman (2011) defines, the distinction between these two terms is that well-being is a 'construct', and happiness is a 'thing'. The single variable is not enough to measure well being entirely, but there are some elements that each contribute to well-being. According to Seligman (2011), each of these elements can be measured and evaluated subjectively or objectively by various techniques. For example, while positive emotion and engagement involve more subjective variables, meaning, relationships, and accomplishment include both subjective and objective factors. There are three concepts in which the authentic happiness theory and well-being theory are differentiated. These are the focal points of the theories, their goals, and their elements (Table 2.1). Happiness is

the main focus of authentic happiness theory. Its purpose is to increase life satisfaction and it uses life satisfaction scale as a measure. Well-being theory is concerned with enhancing well-being and it focuses on positive emotions, engagement, positive relationships, meaning, and accomplishment as a measure. The main goal is to increase human flourishing (Seligman, 2011).

Table 2.1. *Main features of the Authentic Happiness Theory and the Well-Being Theory (Seligman, 2011)*

	Authentic Happiness Theory	Well-Being Theory
Topic	Happiness	Well-Being
Measure	Life satisfaction	Positive emotion, engagement, meaning positive relationships, and accomplishment
Goal	Increase life satisfaction	Increase flourishing by increasing positive emotion, engagement, positive relationships, meaning, and accomplishment

Flourishing has been described in different ways, for example, Aristotelian approach describes flourishing as "optimal human functioning and living to one's full potential, or "being the best person one can be" (Desmet & Pohlmeyer, 2013). As stated by Seligman (2011), in order to flourish a person must have positive emotions, sense of meaning, engagement, interest, and purpose in life. According to Desmet and Pohlmeyer (2013), flourishing people have a purpose in life, they have a sense of meaning, and they often have positive emotions. One of the most comprehensive studies on flourishing was conducted by Jowell and The Central Co-ordinating Team in twenty-three European Union countries (Huppert & So, 2011). As stated by Huppert and So (2011), while some of the studies of well-being particularly have concentrated on *positive feeling* other studies have focused solely on *positive functioning.* However, they integrated both approaches into their framework. Therefore, they have examined flourishing in terms of positive feeling and positive functioning. As a result of the studies, they identified ten key determinants of how much flourished a person is and which can be also used to

measure flourishing. These determinants are *competence, emotional stability, engagement, meaning, optimism, positive emotion, positive relationship, resilience, self-esteem, and vitality* (Huppert & So, 2011). According to Huppert and So (2011), in order to be flourishing, people must have some of these ten elements in certain combinations. Ten features of flourishing and indicator items of these features from the European Social Survey are as follows (Table 2.2);

Table 2.2. *Features of flourishing and indicator items (Huppert & So, 2011)*

Features of flourishing	**Indicator items**
Competence;	Most days I feel a sense of accomplishment from what I do
Emotional stability;	(In the past week) I felt calm and peaceful
Engagement;	I love learning new things
Meaning;	I generally feel that what I do in my life is valuable and worthwhile
Optimism;	I am always optimistic about my future
Positive emotion;	Taking all things together, how happy would you say you are?
Positive relationships;	There are people in my life who really care about me
Resilience;	When things go wrong it takes me a long time to get back to normal
Self-esteem;	In general, I feel very positive about myself
Vitality;	(In the past week) I had a lot of energy

Well-Being Theory has five main components that an individual must independently pursue from each other for their own sake. These elements, abbreviated as PERMA, consist of *positive emotions, engagement, positive relationships, meaning, and accomplishment* (Seligman, 2011). As Seligman (2011) stated, five elements have three basic common features. First of all, they all support well being, and then people follow these elements for their own sake, and finally, each element is identified and evaluated separately from each other.

Positive emotion, usually associated with a pleasant life, is the first element of positive psychology in well-being theory. As mentioned by Seligman (2011),

positive emotion is one of the subjective elements of the theory that includes only subjective components. After the theory of authentic happiness was renewed to well-being theory, positive emotions stayed as the key element. Previously, happiness and life satisfaction were the focal points of the whole theory. However, in the new theory, they began to be processed under the theme of positive emotions (Seligman, 2011). Increasing evidence shows that having positive emotions such as happiness, pleasure, and satisfaction provide various social, intellectual, and physical benefits beyond feeling good for the people (Nehra, Nehra & Dogra, 2012). Positive emotions support holistic thinking, increase attention, enable people to be more creative, improves problem-solving skills, makes it easier to cope with the negative situations, strengthen social life, and minimize psychological symptoms that can be experienced against negative emotions (Nehra, Nehra & Dogra, 2012; Lopez & Snyder, 2011). According to Brey (2014), the way of living a pleasant life highly depends on having positive emotions and learning how to maintain these feelings in the past, present, and future. Seligman's idea that positive emotions have an effect on prolonging human life has been proven in related studies. For example, in background research conducted by Danner, Snowdon and Friesen on people who live under the same conditions but whose life span is very different, it was observed that people who died younger did not talk about any positive emotion, as opposed to people who live longer (Feldmann, 2017). As claimed by Desmet (2012), positive and negative emotions have distinct effects on human behaviors. For example, negative emotions encourage individuals to reject while positive emotions encourage individuals to accept. Also, while negative emotions help people to counteract threats, positive emotions allow them to take action when faced with an opportunity (Desmet, 2015). Positive emotions are often mixed with positive moods and they can be used interchangeably. They both contain temporary subjective emotions and affect people intensely. However, the stimulus and duration of these two are very different (Yoon, 2018). As claimed by Yoon (2018), emotions are usually more severe, and their reasons are obvious. These reasons can be an event, a thought, or a souvenir. However, the causes of

moods are more uncertain and their effects are more diffuse. Because of that people often can't tell why they're in that mood right now. The other difference is their duration. For example, emotions usually last for a few minutes or seconds, but moods can last for a day or a few days (Yoon, 2018).

Engagement is the other element transferred from the theory of authentic happiness to the theory of well-being (Seligman, 2011). In positive psychology, engagement is people's involvement in gratifying activities and benefit from their full strengths and potentials (Riva et al., 2012). In the theory of well-being, engagement often is used with the term flow. Being in the flow requires a person to give all the attention to the present moment and that makes people feel like time has stopped (Seligman, 2011). According to Seligman (2011), there is a need for something in people's life that provides delightful concentration for any activity and keeps people in the present moment. Since engagement requires human effort, it is highly related to the character strengths and abilities (Riva & Gaggioli, 2015). Engaged people lose the concept of the self and time, they are deeply motivated to give all their attention only on a practice that they are engaged in like a personal relationship, job, or social life, and therefore they can stay into a state of flow. Besides, studies show that engagement increases life satisfaction by enhancing human strengths and it expands human intelligence, talents, and emotional abilities (Brey, 2014; Feldmann, 2017). Engagement is an element that is only subjectively evaluated as a positive emotion, and among all five elements of well-being theory, only these two elements contain entirely subjective factors (Seligman, 2011). As claimed by Seligman (2011), the difference between positive emotion and engagement is the subjective phase of the positive emotions is in the moment. However, this phase is retrospective for engagement because there is no thought and feeling in the flow. The subjective phase of the engagement can be assessed solely after the experience like " That was fun" or "That was wonderful".

Meaning is the last element of the renewed theory that has not changed. In the theory of well-being, meaning is defined as serving for something superior

(Seligman, 2011). The search for meaning has a major role in people's lives and also it is a topic that is extensively studied by researchers (Feldmann, 2017). Meaningful life does not require pleasures and engaging practices, it can be obtained by working with one's own special abilities for a great purpose (Pohlmeyer, 2012). When people engage in some actions that support the purpose of life, they feel like their lives are meaningful. Activities that add meaning to people's lives can change from people to people and they range from raising children to working as volunteers to help people (Feldmann, 2017). Unlike positive emotion and engagement, meaning has both subjective and objective components (Seligman, 2011).

Accomplishment is the first of new elements added by Seligman after he renewed his theory. The aim of positive psychology is to describe existing things, not to tell people what to do. Therefore, adding this element does not mean that people must lead a successful life to reach well being, they should find their own ways to benefit from this theory (Seligman, 2011). In order to have a sense of accomplishment, people set goals, they work with a high motivation to achieve them, and finally, they attain their goals. It is not extremely important how big these goals are. For example, reading a book for a few hours a day as a goal and to make an effort to do so is very significant for happiness and well-being (Iasiello, Bartholomaeus, Jarden & Kelly, 2017). The reason why accomplishment is important is it helps a person to create self-esteem, it provides a sense of success and at the same time enhances self-confidence (Seligman, 2011). An effort for achieving a particular objective provides life satisfaction and even people did not reach their goal putting some effort into objectives make them feel good. This is as significant as achieving these goals because it increases self- belief and resistance during difficult situations (Seligman, 2011). Angela Duckworth has contributed to this field with the 'grit' concept which means "perseverance and passion for long-term goals". According to this concept, people continue to pursue their goals in time, they do not give up on during the distress or decline, and the achievements of

many famous people can be shown as examples of this situation (Iasiello, Bartholomaeus, Jarden & Kelly, 2017).

Positive relationship is the last element that comes with the new theory. According to Seligman (2011), only a small part of what is positive happens when people are alone. The relationship is a person's various connections with friends, family, colleagues, and community and a good relationship consist of love, support, and value between people (Iasiello, Bartholomaeus, Jarden & Kelly, 2017). Considering that people are social creatures, it becomes clear that the desire to establish a relationship starts at a very young age and continues for a lifetime and even, according to the research, establishing a relationship is one of the essential needs of human beings (Coffey, Wray-Lake, Mashek, & Branand, 2014). According to the research, a high-quality relationship between friends improves the individual's self-esteem and a relationship that the partners respond to each other with enthusiasm increases well-being (Coffey, Wray-Lake, Mashek, & Branand, 2014). In addition, it is claimed that activities such as sharing good news between people and celebrating achievements together improve relationships and encourage more interaction (Iasiello, Bartholomaeus, Jarden & Kelly, 2017).

In this section, well-being theory, its focal points, objectives, and elements are explained in detail. In the next chapter, one of the very effective methods to apply principles of positive psychology and well-being theory to everyday life that is called " positive psychology interventions " will be explained.

2.1.2 Positive Psychology Interventions

The most significant duty of positive psychology is to create a scientific understanding of well-being and foster flourishing between individuals, families, and societies (Bolier, 2015). Martin Seligman started a new initiative in 2011 called "Flourish 51". He explained the purpose of this new initiative as in 2051, 51% of the world's population will be flourishing (Seligman, 2011). Achieving this

objective requires a great effort but reaching 51% of the population makes "Flourish 51" goals quite difficult even if there are enough methods needed to enhance well-being. Because of that, this initiative is a challenge for health professionals, governments and anyone who wants to enhance well-being (Bolier, & Abello, 2014). Already existing problems are one of the biggest barriers to achieve this goal, for example, the difficulty of reaching mental health services for many people who need help (Bolier, et al., 2013). This condition is called the "mental health gap", which refers to the lack of access to health services for people with subclinical symptoms and who need mental health care but have limited opportunities to find evidence-based resources (Muñoz, 2010). This gap comprises problems such as insufficient money and qualified health personnel, inadequate resources, unconsciousness of the society and individuals on mental health issues, and the lack of awareness of the seriousness of the situation (Bolier, & Abello, 2014). It has been generally accepted that the development of effective, practical, and sustainable positive psychological interventions can help to close this "mental health gap" and also achieve the purpose of "Flourish 51" (Bolier, 2015).

Interventions that have been generated within the Positive psychology discipline called *Positive psychology interventions* (PPIs) and these interventions focus on producing positive outcomes (Gander, Proyer, & Ruch, 2016). Positive psychology interventions have been defined as "treatment techniques or intentional activities aimed at increasing positive feelings, positive behaviors, or positive cognitions as opposed to healing pathology or fixing negative thoughts of maladaptive behavior patterns" (Desmet & Sääksjärvi, 2016). Positive psychology interventions should be created to enhance well-being in the long term. For this reason, they do not include mood induction studies, which are naturally formed to raise mood for a short time (Parks & Titova, 2016). According to the research, interventions developed according to strong theory and supported by behavioral change methods have stronger and longer-lasting effects, whereas the effects of interventions that do not rely on strong theory and behavioral change methods are weak and short-term (Bolier, & Abello, 2014). Furthermore, there are also some features that these

interventions should have in order to be more effective. For example, these interventions should be “non-consumable” to help to solve the mental health gap problem. Non-consumable intervention means they can be used over and over without running out to be useful for more people unlike medications or therapists’ time (Muñoz, 2010). However, most of the existing interventions are consuming resources and they become useless after being used for just one person. This situation has a negative impact on the goal of increasing the number of people who flourished. According to psychology researchers, introducing more innovative and affordable methods to distribute psychological interventions rather than traditional methods would help to achieve this goal (Schueller & Parks, 2014). Another factor that makes positive psychology interventions more effective for both healthcare professionals and individuals is being easily accessible (Parks & Titova, 2016). According to Parks and Titova (2016), positive psychological interventions help people to deal with unfavorable circumstances and moods by spreading positivity in everyday life. PPIs can be effective to enhance well-being by reducing depressive symptoms, anxiety, and stress in different situations such as pain, addictions, and mental or personal disorders (Cebolla, et al., 2017). Besides individuals, they are also helpful tools for clinical psychologists for several different areas such as smoking cessations and chronic or non-chronic pain (Titova, Werner, & Sheldon, 2018). In addition, they are not only beneficial for people who have some kind of problems, but also happy people can benefit from them to increase and sustain their happiness. Therefore, their domain expands from treatment to promotion of mental health (Bolier, & Abello, 2014).

Positive psychology interventions can be delivered in two different modes in general. Firstly, these interventions can be offered to individuals by contacting a professional with various tools. This can be one-to-one interaction between a patient and a therapist or this can be a group session. Secondly, without any contact with professionals, resources can be provided to an individual called self-help (Desmet & Sääksjärvi, 2016). Self-help can be explained as “a person's use of written materials or computer programs or the listening/viewing of

audio/videotapes for the purpose of gaining understanding or solving problems relevant to developmental or therapeutic needs" (Matcham, et al., 2014). As stated by Desmet and Sääksjärvi (2016), among traditional methods, self-help is one of the most powerful modes to deliver positive psychological interventions that can also foster the flourishing of a large population. In addition, it has been proved by the research that self-help interventions show effective results in reducing stress and controlling anxiety (Carissoli, Villani, & Riva, 2015). As specified by Schueller and Parks (2014), one of the main reasons for the use of self-help method in positive psychological interventions is to guarantee that individuals who want to enhance their well-being or who need help can reach evidence-based accessible strategies. Self-help interventions disseminate their strategies through classes, workshops, books and developing technologies such as websites and mobile applications (Schueller & Parks, 2014). The need for innovative, creative, and more effective self-help intervention tools has emerged when traditional methods are insufficient. Emerging technologies have helped to fill this deficiency with non-consumable self-help interventions (Bolier, & Abello, 2014; Carissoli, Villani, & Riva, 2015). Technology-based self-help interventions allow people to solve some problems which traditional methods have such as limited time, inadequate resources, difficulties in accessibility, high cost, and invalidity (Carissoli, Villani, & Riva, 2015). Although they have many advantages, it is important to note that there are some points to be considered when creating self-help interventions. For example, although people read self-help books, they need to apply what they read in order to be able to benefit from these books. However, people often need various external supports to spend their time and effort that are desired to change behavior. However, according to Bolier and Abello (2014), technological interventions can raise engagement and adaptation of these interventions into daily life by using special prizes and features that create social connectivity. This proves that it is highly important to spread of interventions through technology and the Internet in achieving the aims of "positive psychology" and the "Flourish 51".

Positive psychology tries to figure out positive parts of the human functioning and studies on positive human cognition, emotions, and character traits. According to the findings of recent research, various strategies have been formed that enhance happiness when applied. After that, these strategies are converted into effective interventions (Schueller & Parks, 2014). After the literature review of positive psychology, it is observed that various different strategies can increase happiness. For example, (1) writing gratitude letters (2) counting one's blessings (3) being kind, (4) cultivate strengths (5) visualize ideal future and (6) meditate. Some of the important advantages of these activities are they do not require too much time or money and they can be self-managed without much need (Lyubomirsky, & Layous, 2013). These strategies were combined and reclassified into seven categories. These are 1) savoring, 2) gratitude, 3) kindness, 4) empathy, 5) meaning, 6) optimism, and 7) strengths (Parks & Titova, 2016).

The goal of the *savoring* is to strengthen and prolong momentary experiences for more delightful outcomes by increasing attention and awareness (Parks & Titova, 2016). Savoring experiences can differ from sensory ones such as eating or smelling to mental and cognitive ones such as memories or emotional experiences (Schueller & Parks, 2014). As stated by Schueller and Parks (2014), people who become involved in more savoring activities have greater happiness, life satisfaction, and less depressive symptoms. According to related research, there are some elements that raise the savoring of experience, for example, focusing on meaning during the experience, taking some notes and recording these moments, sharing with people, embodying some humor and being aware of the moment (Parks & Titova, 2016).

Gratitude is the emotional response of someone who has experienced something positive that caused by external agents. These agents can be a person or an event (Schueller & Parks, 2014). Gratitude interventions focus on the reflection of experience or motivation of just feeling gratitude. All diverse gratitude PPIs enhance well-being, reduce depression, raise positive emotions, and improve

general health (Parks & Titova, 2016). Regarding gratitude PPIs, it should be kept in mind that one-time but strong gratitude activities have short-term but powerful effects, but over time they lose their power (Schueller & Parks, 2014).

Kindness interventions request people to show intentional kindness towards people. Kindness acts promote happiness and also according to the related research, happy people demonstrate more kind acts (Parks & Titova, 2016). Various examples of kindness activities are giving little gifts for someone, donating something, carrying someone's bags, complimenting a stranger, opening a door or helping a friend with his project (Schueller & Parks, 2014). As stated by Parks and Titova (2016), kindness activities have a specific category called "prosocial spendings" that means spending some money for other people without asking for anything. For example, helping a homeless person or donating something for charities.

Related research indicates that having an ability of *empathy* is crucial for happiness (Parks & Titova, 2016). A higher number of social contacts and increasing the quality of these contacts are two important factors to fostering happiness (Schueller & Parks, 2014). Different strategies can be applied to have better interpersonal relationships. For example, as reported by Parks and Titova (2016), loving-kindness meditation is very effective PPIs for social relationships. By this method, people can increase positive feeling towards other people and also loving-kindness meditation increase life satisfaction and reduce depression by supporting positive emotions. To enhance the quality of relationships, another effective method is using active-constructive responding. It means showing some excitements towards good news and broadening the conversation by asking questions about these good news (Schueller & Parks, 2014). According to Schueller and Parks (2014), savoring and promoting positive relationships are two similar strategies in many ways like they both tend to increase the intensity and duration of the experience.

Interventions that are concentrating on *meaning* try to find things which create meaning to a person's life and also what kind of activities should be pursued to

increase meaning (Parks & Titova, 2016). Recent research on meaning shows that having meaning in life increase happiness and life satisfaction (Schueller & Parks, 2014). As stated by Parks and Titova (2016), there are some methods to promote meaning by PPIs. For example, having some hopes for the future can support meaning, particularly belief that a person can achieve own goals. Also, hope is a very important component of well-being. Another method to increase meaning and happiness is to educate people to learn to set some goals and to make plans.

Optimism interventions expect people to imagine a positive future and form positive expectations (Parks & Titova, 2016). According to Parks and Titova, (2016), for example, in an optimism activity, people are expected to write the best possible version of them in the future. Although it is a very easy activity, this can significantly increase well-being. Another optimism example is called "Life Summary". In the Life Summary activity, people are asked to write a 1-2 page biography that they imagine having a long and delightful life. At the end of the exercise, they are expected to evaluate how they spend their daily lives and discuss whether they might change anything to achieve their ideal life (Parks & Titova, 2016).

Strengths interventions help people to realize, use, and improve their own strengths (Parks & Titova, 2016). As stated by Parks and Titova, (2016), in a study conducted by Seligman, the participants were asked to identify and use their strengths and eventually, a higher level of happiness and lower level of depression were observed. In addition, research indicates that it is more enjoyable for participants to focus on improving strengths rather than only identifying. Practitioners have to be careful to create strengths-based interventions and they have to be sure that this intervention is appropriate. For example, if honesty is defined as strength, there can be some conditions in which honesty can hurt other people's feelings or cause a conflict. This can be explained by the concept of "practical wisdom", which means that people should use their strengths when they are appropriate and useful (Parks & Titova, 2016).

The tools used to implement these strategies into the real-world need to have some characteristics like being easily accessible, understandable and affordable (Schueller & Parks, 2014). The most popular mediums to disseminate these strategies are course-based interventions, book-based interventions, and technology-based interventions (Parks & Titova, 2016).

Course-based interventions aim to increase happiness by offering different instructions to people (Schueller & Parks, 2014). Lately, the number of courses that have some self-help elements into their standard education or focused exclusively on self-help has increased. These courses commonly provide theoretical knowledge but also some of them offer students the opportunity to gain practical skills to manage their own well-being in the future (Parks & Titova, 2016). For example, in these courses, various short-term or long-term tasks may be given like "take part in legal activities that you think will make you a little happier within an hour", or "choose an accessible and personally valuable goal that can be accomplished at the end of the academic term". These practical experiences are then discussed in the classroom (Schueller & Parks, 2014). As mentioned by Schueller and Parks (2014), as the number of these courses increases, people who want to develop their happiness will have access to the best scientific methods. Furthermore, a novel form of free online courses that are addressing a more diverse group of people than traditional courses may be particularly valuable in ensuring that the PPIs are more accessible to the general public (Parks & Titova, 2016).

The most popular, accessible and inexpensive forms of interventions are book-based self-help interventions and these book-based interventions have high potential to increase well being of mass populations (Parks & Titova, 2016). The increasing number of scientific interventions to enhance happiness has caused many researchers and positive psychologists to write books to raise the happiness of the population (Schueller & Parks, 2014). When compared to research articles, focusing on the dissemination of knowledge by specific strategies, books are more appropriate for the lay people (Schueller & Parks, 2014). In a study, the

effectiveness of two self-help books that aim to increase well-being of students has been analyzed. These books were randomly distributed to the students. The first one is *The How of Happiness Book*, a positive psychology-based book that involves many PPI activities, and the other book is *Control Your Depression*, a book related to principles of Cognitive Behavioral Therapy. At the end of the study, it was found that both books reduced the symptoms of depression. However, the positive psychology book offered higher life satisfaction increase. In addition, students with a positive psychology book stated that the activities in this book were more enjoyable and meaningful and also the strategies were more effective (Parks & Titova, 2016). Even though books have high potential to effectively disseminate psychology strategies, they have some limitations. For example, self-help books are for a specific group of people who like to read. In addition, evidence shows that problem-based self-help books are only helpful for people who have particular problems (Desmet & Sääksjärvi, 2016).

Although several psychological interventions have had a significant impact in reducing the symptoms of depression, these interventions can be unattainable to many people because of high prices and difficulty in access to health services (Firth, et al., 2017). The development of technology requires the association of wellbeing factors and everyday products in a smart and precise manner (Calvo, Vella-Brodrick, Desmet, & Ryan, 2016). While research on more effective alternatives to disseminate positive psychology continue, studies on technology has shown that it can be a very effective tool for many people (Desmet & Sääksjärvi, 2016). The spread of Internet access and computer-based technologies has introduced new ways of generating such interventions and has offered researchers with lots of opportunities to produce scalable, entertaining, and engaging interventions (Firth, et al., 2017). While the book-based interventions need people to implement strategies in appropriate settings after reading it, technology can simplify self-help by providing in-depth integration of interventions into daily life (Schueller & Parks, 2014). Besides, technology-based interventions solve the problem of time needed for self-help books and courses (Parks & Titova, 2016).

The most used forms of technology-based interventions are Internet sites and mobile applications (Schueller & Parks, 2014). Recent studies show that these two tools are effective in increasing happiness and well-being, and reducing anxiety compared to the control group (Firth, et al., 2017). These mediums can provide activities that focus only on one strategy such as gratitude or they can combine different strategies like gratitude, savoring, and kindness (Parks & Titova, 2016). The increased use of smartphones adds an extremely critical dimension to positive psychological interventions and provides billions of users network. This proposes a new easily accessible, viable, and effective way to happiness seekers to reach positive psychology interventions (Howells, Ivtzan, & Eiroa-Orosa, 2014).

While studies on effective methods that can be used by different positive psychology strategies and tools used to disseminate PPIs have continued, meditation has emerged as a different alternative (Cebolla, et al., 2017). When meditation is examined within the framework of positive psychology, the evidence shows various positive effects of these meditation-oriented interventions on well-being and life satisfaction (Nehra, Nehra & Dogra, 2012). Mindfulness meditation and positive psychology share various common goals such as supporting resilience by increasing one's awareness of the self and context and help to control mind and emotions (Nehra, Nehra & Dogra, 2012). According to Cebolla et al. (2017), although there are many different types of interventions in positive psychology, which have some common elements with mindfulness meditation, there are basically two interventions, flow and savoring that have the most common features. Firstly, recent studies conducted in the field of psychometric show a positive relationship between flow and meditation. For example, flow or in other words optimal experience is a subjective condition that people experience when they are fully involved in an activity. When in this state, they forget the concepts of time and self because they are deeply focused on their activity. These features also exist in many different types of meditation (Cebolla, et al., 2017). Secondly, savoring and meditation has fundamental similarities, for example, both encourage intentional and systematic participation in every aspect of experience (Schueller &

Parks, 2014). They both support people to find their life goals, allow people to be guided by their internal values, help them to seek to develop their positive aspects and emphasize the importance of positive emotions. In addition, they motivate people to develop their psychological strengths such as kindness, compassion, civility, etc. (Cebolla, et al., 2017).

The topics discussed in this section were positive psychology interventions, their delivery methods, tools, and the strategies used by these interventions. In the next chapter, one of the newly popularized strategy in positive psychology, meditation will be discussed in two different aspects as traditional meditation and meditation that conceptualized by western.

2.2 Meditation

This section includes different definitions of meditation, its history, various meditation types in different cultures, the transition of the meditation to the secular fields and its use in this field, and finally, its taxonomic classification.

2.2.1 Traditional Meditation Practices

Meditation is an estimated 5000 years of inclusive practice in many different religions, cultures, and regions with different techniques and purposes (Schmidt, 2013). Meditation comes from Latin words *meditatio* which means “think over, reflect, consider,” and *meditari* which means “to engage in contemplation” (Khema, 2016). As a word, meditation also means "deep thinking" in many Western languages (Uğurlu, 2011). Although meditation has been studied many times in different literature, there is no agreed definition since it is practiced in numerous different ways, for different purposes and comes from different origins (Schmidt, 2013). For example, according to some definitions, all types of meditation have religious and spiritual parts (Khema, 2016). There are various definitions that explain meditation as a process of self-experience and self-

realization (Walsh, & Shapiro, 2006). While some definitions claim that meditation is the exercise of training mind, other definitions state that meditation is a self-observation process and aims to increase awareness (Schmidt, 2013). There are also expressions that describe it as a technique of controlling the mind and body, which enables the person to attain inner peace, serenity, superior states of consciousness (Khema, 2016).

According to Khema (2016), a Buddhist teacher, people continuously think about the future or the past. She even specifies that younger people think more about the future and older people think more about the past. However, life cannot be lived in the past or in the future. According to her, it is necessary to live every moment in order to experience life. As specified by Khema (2016), people regularly take care of their bodies by eating, exercising, resting, cleaning, and protecting when necessary. However, they should give the same importance and attention to their minds. She states that meditation is a great way to achieve these purposes.

Although meditation seems to belong to specific religions and cultures, it is a worldwide practice with similar applications in every major religion and most cultures (Jadhav, Manthalkar, & Joshi, 2017). Meditation, in which the first examples are encountered in the traditional texts of Hinduism Vedas, has a very important place in Hinduism and Buddhism (Uğurlu, 2011). As stated by Uğurlu (2011), it is even considered as one of the main components of these two religions. Furthermore, other religions have several variations and adaptations (Ospina, 2007). Examples of practices in other religions and cultures are quiet-sitting in Confucianism, yoga in Taoism, Hassidic in Judaism, Salah, Tefekkur and Sufism's Zikr in Islam and contemplations in Christianity (Ospina, 2007; Walsh & Shapiro, 2006).

The purposes of meditation and its practices vary between these religions and cultures (Schmidt, 2013). For example, Hindu meditation aims to achieve peace, spirituality, and physical health through body and mind exercises. It uses different contemplation, self-awareness, and concentration techniques (Jadhav, Manthalkar,

& Joshi, 2017). As specified by Jadhav, Manthalkar and Joshi (2017), purposes of Hindu meditation are cultivating inner peace and spiritual awareness. Some important types of Hindu meditations are mantra meditation, transcandantional meditation and yoga meditation (Schmidt, 2013).

Buddhist meditation, which was formed by the evolution of ancient Hindu meditation, focused on mental training to accomplish two sacred goals (Jadhav, Manthalkar, & Joshi, 2017). The first one is the achievement of supreme wisdom to deal with the difficulties of the world and the second one is the elimination of pain and the attainment of nirvana "perfect stillness". According to Buddhist meditation, after this phase death and rebirth cycle disappears (Schmidt, 2013). In Buddhism, different types of meditation have been formulated and accepted by Buddhists and even non-Buddhists who have been willing to search internal resources and inner foundations (Schmidt, 2013). The most important of these are vipassana meditation, mindfulness meditation, compassion and loving-kindness meditation (Schmidt, 2013). Although the practices and purposes of these meditations are different, enlightenment and transcendence are common points of all of them, which are one of the goals of Buddhism at the same time (Ospina, 2007).

Taoist meditation, along with Chinese philosophy, aims to create harmonious unity of nature and human that is working through the essence, vital energy, and spirit (Schmidt, 2013). According to Schmidt (2013), Taoist meditation reinforces bodily energy and creates a body-mind connection by focusing on concentration and inner serenity. Taoist meditation has a special sitting position and breathing technique that allows the vital energy "qi" to circulate throughout the whole body. These special techniques provide relaxation and increase the temperature of the body which is beneficial for blood circulation (Jadhav, Manthalkar, & Joshi, 2017). All Hindu, Buddhist, and Taoist meditations focus on inner serenity, mind transformation, self-development, and self-completion by using specific techniques such as awareness of mental and bodily sensation (Schmidt, 2013).

In Abrahamic traditions, meditation has an important function in showing devotion to religion (Uğurlu, 2011). In Christianity, prayer and contemplation is a method of meditation and enables the individual to communicate with God (Schmidt, 2013). As stated by Schmidt (2013), through prayer and contemplation, individuals seek the meaning of life. Regular exercises of these methods increase inner serenity and provide a calm mind. Furthermore, it is possible to see the practice of meditation in various worships in Islam and with these worships, Muslims aim to get closer to Allah and clean their souls and also in Judaism, meditation practices are seen in prayer and fasting process (Uğurlu, 2011).

Different types of meditation practices have physical, mental, and spiritual benefits (Ospina, 2007). According to Ospina (2007), some of these benefits are spiritual growth, enlightenment, self-transformation, body and mind regulation, mental discipline, the unity of the human being with soul and god, and the attainment of serenity.

This section covered the brief history of traditional meditation, its several definitions, variations in different religions and cultures as well as purposes and benefits. In the next section, the transition of traditional meditation to the West, the changes it encounters, its redefinition and secular benefits will be discussed.

2.2.2 Secular Conceptualizations of the Meditation Practices

As mentioned above, meditation has thousands of years of history and there are practices that can be considered as meditation in many religions (Uğurlu, 2011). However, it is argued that meditation should no longer be overshadowed by religious or spiritual activities (Schmidt, 2013). As specified by Schmidt (2013), for the last few decades, many trends that use scientific data and include meditation practices, independent of religions, aim to raise awareness of people about meditation. Meditation was able to change its definition of sitting and doing nothing for those who were not interested in the last several years (Ospina, 2007).

Today, meditation is considered a secular technique that people can use to achieve their goals, benefits, and virtues (Schmidt, 2013). As this practice is increasingly accepted in the public, meditation and attention-based approaches have begun to be applied in many clinical or academic contexts (Uğurlu, 2011).

According to research, meditation came to the West in different ways. To one view, the main reason that initiated scientific research about meditation is the cultural changes stemming from the Vietnam War and the hippie movement in the 1960s (Schmidt, 2013). To another view, mindfulness meditation, which is adapted from Buddhist Vipassana meditation, was presented to the west by Thich Nhat Hanh. Then, his student, Jon Kabat-Zinn began to do scientific research about mindfulness meditation and created one of the most important scientific practices about meditation in 1979 which is mindfulness-based stress reduction intervention (Jadhav, Manthalkar, & Joshi, 2017). Thus, the first scientific research on meditation began in the 1970s but decreased again in the 1980s (Schmidt, 2013). According to Schmidt (2013), interest in meditation research has increased again in the 1990s for different reasons. The first reason is the advancement of neuroscience, which provides new knowledge to the brain and its processes with more advanced methods. The second reason is that Western regard consciousness as a serious subject for scientific research. The third reason was the Mind and Life Dialogues with the Dalai Lama by Adam Engle and Francisco Varela in 1980s (Schmidt, 2013). The Mind and Life Dialogues consist of conversations about problems of modern life between leading thinkers and spiritual leaders such as the Dalai Lama (Bstan-dzin-rgya-mtsho, Houshmand, & Zajonc, 2004).

As in traditional meditation, there is no agreed definition of meditation in secular approach. However, in order to make sure that everyone is talking about the same object, structure, or concept, and to distinguish it from similar concepts, some characteristics must be determined (Kasala, Bodduluru, Maneti, & Thipparaboina, 2014). As stated by Schmidt (2013), various approaches focus on different points of meditation. For example, some argue that it is a process of self-regulation and focus on attention and awareness while others claim that it is a process of

thoughtless awareness and focus on relaxation and concentration. However, there are some agreed points. For example, researchers state that it is a process of detached observation, which requires mental constancy and emptiness in which people are conscious of their context but are not participated (Schmidt, 2013).

A study examining various research in the field of meditation has developed a definition that includes common points of traditional meditations and meditations used in clinical settings (Schmidt, 2013). According to Schmidt (2013), in order to define a practice as meditation; it has to;

(1) use a particular and well-defined method,

(2) include muscle relaxation at some point during the procedure,

(3) comprise logic relaxation (for example; it should not engage in activities such as analyzing possible psychophysical impacts, assess possible outcomes, or produce any expectations during the process.)

(4) be a self-inflicted condition and

(5) apply self-focusing ability or benefit from a different kind of "anchor" to attract attention.

(6) include consciousness state, mystical experience, enlightenment, or stopping rational thought period for a while.

(7) occur in a religious / spiritual / philosophical context.

(8) include quiet mind experience.

Meditation attracted the attention of clinicians, researchers and the public after successful results were obtained and it was approved that it is a main scientific mind-body intervention (Ospina, 2007). As reported by Ospina (2007), meditation is the leading mind-body intervention widely accepted by general health care providers and it has embodied into various therapeutic applications in hospitals and clinics all around the world. Research has shown that meditation has many benefits

to psychological and physical health in people of all ages and correspondingly it increases well-being. It has been observed that meditation has positive effects in the treatment of physical diseases such as chronic pain, fatigue, hypertension, asthma, heart diseases and cardiovascular disorders, blood pressure, menopause-related problems, cancer symptoms, dermatological cases, eating disorders, musculoskeletal, respiratory, and immunological problems (Cheng, 2018; Kasala, Bodduluru, Maneti, & Thipparaboina, 2014; Ospina, 2007). Furthermore, concentration, depression, anxiety, stress, posttraumatic stress disorder, obsessive-compulsive disorder, sleeping problems, social and behavioral problems, and drug abuse are some psychological problems in which meditation is used in treatment (Cheng, 2018; Ospina, 2007; Walsh, & Shapiro, 2006). Especially, prenatal yoga is an extensively accepted method for preparing pregnant women for birth and strengthening their mental condition during pregnancy (Cheng, 2018).

In this section, the transition of traditional meditation to the Western culture, changes that it has faced, its redefinition and secular benefits were explained. In the next section, variables that can be used to define and classify meditation will be discussed.

2.2.3 Taxonomic Dimensions of Traditional and Secular Meditation

Meditation has a large number of explanations, methods, structures, and procedures that are different and independent of each other. These complicated varieties of meditation applications produce difficulties in conducting proper examination and research in the field of meditation (Allbritton & Heeter, 2018). However, a well-structured and practical taxonomy can effectively frame the whole theoretical concepts of a specific discipline (Nash & Newberg, 2013). Furthermore, the formation of a taxonomy system for meditation is crucial to cope with the definition related problems and even to encourage further research into meditation practices (Schmidt, 2014). In addition, the ability to differentiate meditation from other therapeutic applications such as hypnosis or visualization and other relaxation

methods shows the necessity of this taxonomy (Ospina et al. 2007). However, the problem of lack of a consensus definition in identifying meditation also arises in creating a taxonomy system for meditation (Nash & Newberg, 2013). Many different studies have tried to develop taxonomy by focusing on different aspects of meditation. Some important dimensions obtained by combining these resources were described below.

The *person* is the main actor in the meditation that has experience and various outcomes (Allbritton & Heeter, 2018). This individual usually has a *motivation* to meditate. Motivation is about why an individual meditates and what the motivational factors are for her or him (Schmidt, 2014). According to Schmidt (2014), this motivation can be an *experience* itself which a person has during the meditation or a specific *outcome*. Although these outcomes were more *spiritual* in the early periods, *therapeutic* outcomes have begun to be obtained after the use of meditation as a secular practice (Ospina et al. 2007). In an online survey where 549 people participated, 58 motivational scales were analyzed with a Likert scale and the remaining 31 items were evaluated after the 27 items removed due to low effect. These factors are grouped under 4 basic concepts and their rankings from the most motivated to the least motivated are as follows; Wellbeing, emotion-regulation such as calming, relaxation and stress reduction, self-exploration like examining mental patterns, self-transformation which is mostly related to spiritual outcomes. In addition, when this questionnaire was repeated with participants who had more experience in meditation, the value of well-being as motivational item decreased, while the value of self-transformation increased. This means that as the experience of meditator increases the motivation of spiritual outcomes are getting more important (Schmidt, 2014). In addition, pain reduction, concentration, love, and wisdom are other motivational outcomes of meditation (Walsh & Shapiro, 2006).

Experience is the second most important concept for meditation after the person and it covers everything that is encountered in the process (Allbritton & Heeter, 2018). As stated by Allbritton and Heeter (2018), a meditation experience consists

of *internal* and *external factors*. Internal factors are related to how a person uses his or her *body, mind* and *breath* during the meditation. When the different body-related activities used during meditation are examined, it can be seen that they can be grouped under four main categories as *body movement, body posture, eye position,* and *vocalization* (Nash & Newberg, 2013; Ospina et al. 2007; Roquet & Sas, 2018; Walsh & Shapiro, 2006). The body movements during meditation can be in two ways: the first one is *static* and the second one is *kinetic (*Roquet & Sas, 2018). If the body movement is static that means a stationary body that generally stays in a fixed place but it does not have to be a motionless body, small body movements and unintentional reactions are acceptable (Nash & Newberg, 2013; Roquet & Sas, 2018). If the body movement is kinetic, this means that the body has certain postural guidance. Some examples are mindfulness walking, Tai Chi, and Mudras. Moreover, these kinetic body movements have some effects on energy usage, adrenal, cardiovascular, and respiratory functioning (Nash & Newberg, 2013). According to Nash and Newberg (2013), some different meditation types may require specific body postures like *sitting, laying, standing*, or more *specific posture* such as in yoga. This is because the brain reacts to different body postures in different ways. Besides body movements and body postures, the position of eyes another important dimension. The eyes should be *closed* during some meditation applications while they may need to be *open* during others. The main reason for this is that the brain is affected by the visuals, for example, activation of the visual cortex increases, especially when looking at a complex image (Nash & Newberg, 2013; Roquet & Sas, 2018). Another crucial dimension is vocalization. The meditator can be expected to remain *silent* or can be *auditory* during the meditation. Sounds stimulate the auditory cortex and thalamus and affect brain function. In addition to the silent or auditory process, inner speech should also be considered under this category (Nash & Newberg, 2013). Some meditations have specific breath instructions, and they require the application of various breathing techniques. Various breathing techniques have different effects on the brain and body. For example, some breathing techniques can cause changes in heart rate,

blood pressure, metabolism and brain functioning (Nash & Newberg, 2013; Roquet & Sas, 2018).

Most of the studies that attempt to create a taxonomic system for meditation focus on attention and they try to form a classification according to the *attention regulation strategy* (Roquet & Sas, 2018). When these studies are examined, it is observed that there are basically three different types of attention regulation strategies. These are *focus attention, open monitoring, and automatic self-transcendence* (Allbritton & Heeter, 2018). Focus attention requires a constant focus on a selected object during meditation (Walsh & Shapiro, 2006). In this process, attention should not be distracted (Schmidt, 2014). As stated by Schmidt (2014), some examples are Buddhist Samadhi meditation and concentration meditation. Open monitoring is a process in which the individual observes every phenomenon in mind and surrounding and also distraction is not important (Schmidt, 2014). The individual is aware of every experience he or she has and makes continuous observations during this process (Allbritton & Heeter, 2018). The object that the individual generally focuses on is less tangible compared to the focus attention and the most common one is breath (Allbritton & Heeter, 2018; Schmidt, 2014). Some examples are Buddhist Vipassanā meditation and mindfulness meditation (Schmidt, 2014). Automatic Self-Transcendence is another method that is rarely used in taxonomies and refers to situations in which meditation does not require any focus or effort (Allbritton & Heeter, 2018). In a taxonomic system about meditation, it is also very important to emphasize the *object* to which the individual directs his attention because different objects cause different reactions in the individual (Allbritton & Heeter, 2018; Nash & Newberg, 2013). For example, the color, simplicity, or complexity of the visual causes different physiological effects (Nash & Newberg, 2013). Some commonly used object examples are mantras, breath, sound, light, body sensation, physical object, idea, god, nothingness (Allbritton & Heeter, 2018; Nash & Newberg, 2013). During the meditation, the individual may be present in three different *altered states*. These are the *cognitive state* in which the individual is quite aware of

everything, the *affective state* in which the individual is partially aware, and the *null state* in which the individual is not affected by anything (Allbritton & Heeter, 2018). As seen in different types of meditation that there are two different types of *cognitive strategies* that an individual can apply during meditation. These are *observation* and *modification*. In observation strategy, the individual observes the mental state, while in the modification strategy the individual aims to modify it (Walsh & Shapiro, 2006).

When trying to create a taxonomic system for meditation, external factors are as important as internal factors. These external factors can be examined under three different topics such as *context, guidance,* and *delivery.* As stated by Allbritton and Heeter (2018), the context contains information about the place where the individual meditates and some condition of that place. Some meditations types such as mindfulness-based stress reduction need to be applied in more controlled and equipped environments. Some examples of context are *home, yoga class, meditation center*, *MBSR program center*, *research lab* (Allbritton & Heeter, 2018). Meditation *guidance* can be in two forms such as *intrinsic* and *extrinsic*. Intrinsic guidance is self-reliant and individual gives his or her directions. Extrinsic guidance is depended on a teacher or a specialist to give directions (Roquet & Sas, 2018). *Delivery* methods and tools are other crucial external factors that affect meditation experience. Meditation can be delivered to the individual in many different ways. For example, it can be delivered with *recorded materials*, in *written format*, or by a *physically* face-to-face meeting with a teacher or specialist. In addition, it can be delivered with technology-based products, for example, website, Smartphone App, or online class. Also, meditation can be provided to a *group* of people or an *alone* individual (Allbritton & Heeter, 2018).

In this section, it was explained that a taxonomic system should be created in order to carry out scientific studies in the field of meditation and various taxonomic elements from different sources were brought together that can be used in meditation taxonomy (Figure 2.1).

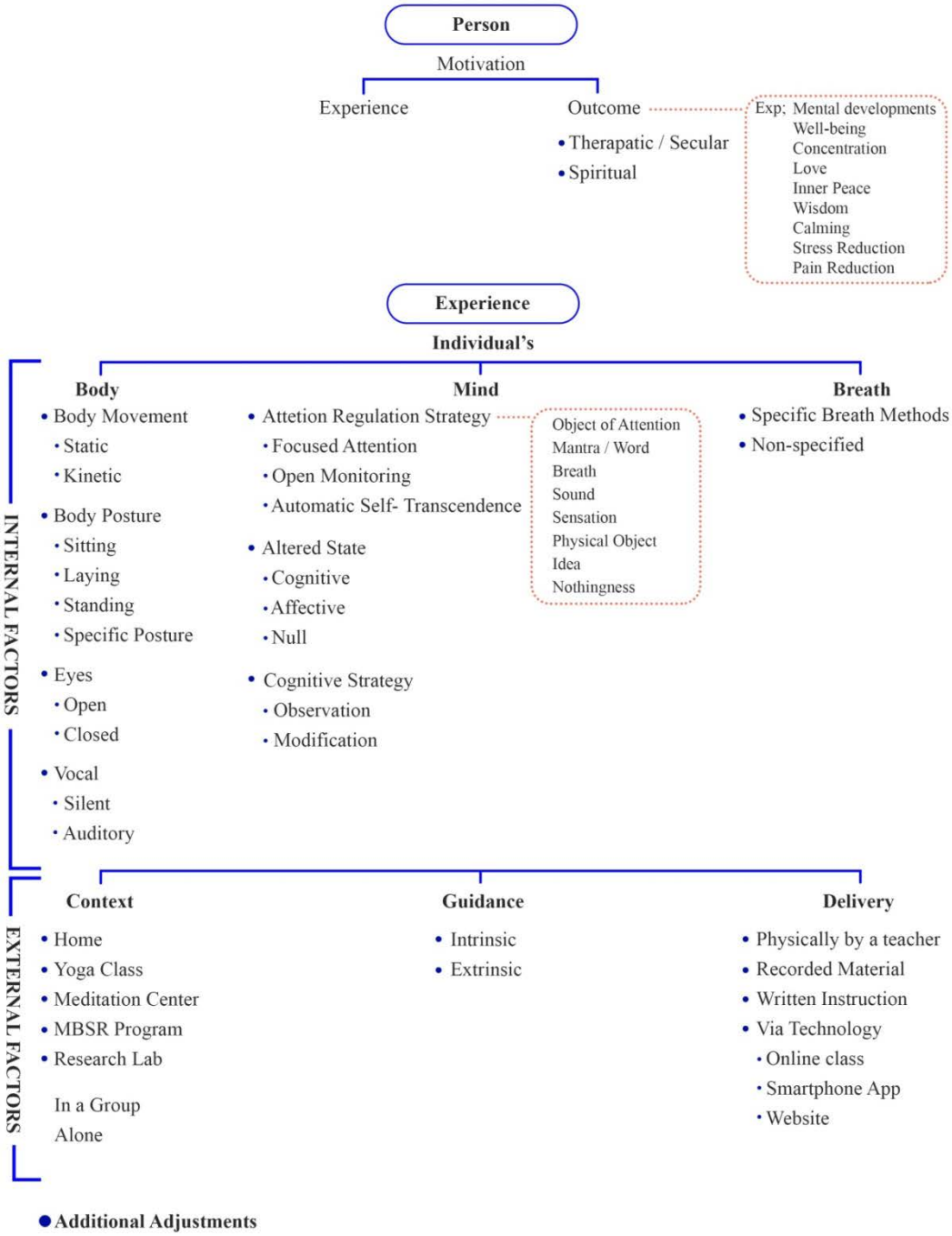

Figure 2.1. Taxonomic dimensions of meditation (Adapted from; Allbritton & Heeter, 2018; Nash & Newberg, 2013; Ospina et al. 2007; Roquet & Sas, 2018; Schmidt, 2014; Walsh & Shapiro, 2006)

2.3 Approaches in Technology Design for Well-Being

Most of the activities performed during the day have become increasingly dependent on various types of technologies. These technologies such as smart phones, tablets, computers and wearable devices which people spend long hours, have become an indispensable part of life both inside and outside of home (Gaggioli et al., 2017). However, as Gaggioli et al. (2017), mentioned, there is an important question to investigate like 'Have these technologies that made our lives easier also make us happier?' While most of the studies in this area are investigating the negative effect of technology, there are limited studies about the contribution of technology to happiness and well-being (Gaggioli et al., 2017). However, with the studies in the field of cognitive sciences and positive psychology, many new research approaches have emerged. These new approaches focus on improving well-being of individuals, organizations, and communities (Riva et al., 2018). In recent years, with the emergence of these approaches, the desire to produce something for happiness, well-being, and flourishing in the field of HCI has increased (Peters, Calvo, & Ryan, 2018). The most important examples of these new approaches are Positive Technology, Positive Computing, Positive Design, and Experience Design (Table 2.3). These approaches aim to increase well-being with different techniques by focusing on different psychological needs (Peters, Calvo, & Ryan, 2018).

Table 2.3. *Positive approaches in technology design (Gaggioli, Riva, Peters, & Calvo, 2017; Peters, Calvo, & Ryan, 2018)*

Positive Approach	Related Field	Theories & Strategies		
Positive Technology	Positive Psychology + HCI	Personal Experiences	Hedonic Eudaimonic Social/Interpersonal	Emotional quality Engagement/actualization Connectedness
Positive Computing	Positive Psychology + HCI	Subjective Experiences	Self Determination Theory	Autonomy Competence Relatedness
Positive Design	Positive Psychology + Design	Subjective Well-Being (Hedonic Well-Being)	Design for Virtue Design for Personal Significance Design for Pleasure	Being morally good person Pursuing personal goals Experiencing positive effect (positive feelings)

2.3.1 Positive Technology

In the world where technology is spread everywhere, can technology be used as a tool to improve well-being and increase flourishing? In order to achieve this, combining some of the goals of positive psychology with some new technologies in the field of human-computer interaction (HCI) is shown as an effective method (Botella et al., 2012; Downey, 2015). One of the approaches that have this goal at its core is *Positive Technology* (Downey, 2015). Especially, in the last decade, positive technology has attracted the attention of many researchers from different disciplines and various new research have been published in this field. As it is a newly developing area, the studies have focused on defining the boundaries and concepts of approach and developing analysis methods (Gaggioli et al., 2019). Positive technology unites positive psychology and technology to improve the quality of personal and collective life (Downey, 2015). Positive technology outlines a scientific and practical approach that can be described as " using

technology to build new personal experience or enhance the quality of existing personal experience to reinforce the wellness, strength and resilience of people, institutions and communities (Bolier, 2015; Botella, et al., 2012; Gaggioli & Riva, 2015).

Experience is described in the Merriam Webster dictionary in two ways “a) the fact or state of having been affected by or gained knowledge through direct observation or participation” which is *personal experience*, and “b) direct observation of or participation in events as a basis of knowledge” which is *subjective experience* (Gaggioli & Riva, 2015). According to this definition, people can shape experiences and at the same time, they can be shaped by experiences (Riva et al., 2012). Accordingly, people can purposely control the content of experience (subjective experience), but these experiences also determine their future feelings and intentions (personal experience) (Gaggioli & Riva, 2015).

Personal experience is a dependent concept which can be manipulated by technological tools and different methods (Gaggioli & Riva, 2015). Three specific determinants of personal experiences, which are adapted from cognitive and positive psychology and can be manipulated with technology, are defined. These are *emotional quality*, *engagement/actualization,* and *connectedness* (Botella et al., 2012; Gaggioli & Riva, 2015). As stated by Botella et al. (2012), the main purpose of positive technologies is to create the hedonic experience by enhancing emotional quality, eudaimonic experience by enhancing engagement/actualization or social/interpersonal experience by enhancing connectedness (Figure 2.2).

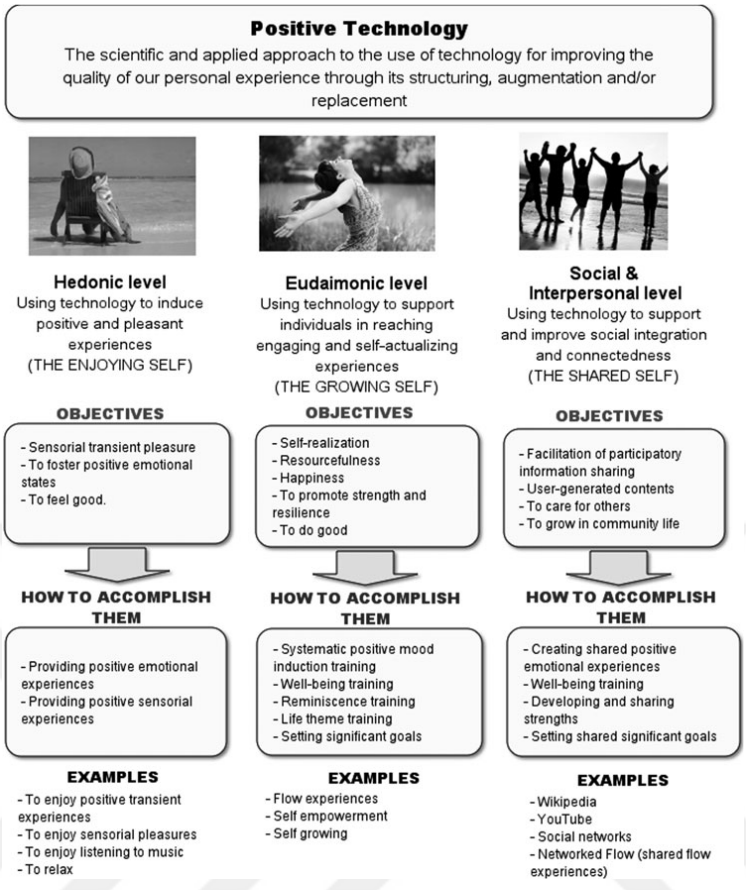

Figure 2.2 Positive Technology: Levels of positive human functioning using ICT's tools and positive psychology goals (Botella, et al., 2012)

Hedonic level deals with using technology to develop positive emotions such as joy, relaxation, or savoring, happiness, excitement (Botella et al., 2012). Positive technologies provide hedonic experiences, promote positive and pleasant experiences, and increase emotional quality (Downey, 2015). Technologies that are used to regulate and control emotions like mood-altering devices are examples of these technologies (Botella, et al., 2012). Eudaimonic level focuses on technologies that help people to have engaging and self-actualizing experiences (Gaggioli & Riva, 2015). Virtual reality (VR) and augmented reality (AR) technologies are the most widely used technologies in this field. Social/Interpersonal level interested in technologies that foster and strengthens connectedness between people, groups, and

organizations (Gaggioli & Riva, 2015). According to Botella, et al. (2012), social and interpersonal problems can be solved by using positive technologies that have an Internet connection or social networks (Table 2.4).

Table 2.4. *Personal experience factors manipulated by positive technology (adapted from Gaggioli & Riva, 2015; Riva et al., 2018)*

Determinants of Personal Experience	Key Factors	Literature & Theory	Strategies (Augmentation, Structuration and Replacement)
Emotional Quality (Hedonic Level)	Positive Emotions	- Building & Broadening Effect (Fredrickson); - Writing Therapy (Pennebaker) - Hedonic Psychology (Kahneman);	Writing Therapy; Exposure Therapy and Relaxation; Savouring; Positive ruminating; Reframing Compassion & meditation.
	Mindfulness	- Mindfulness based Stress Reduction (Kabat Zinn);	Mindfulness meditation; MBSR strategies; MBCT strategies.
	Resilience	- Psychology of resilience (Seligman, Keyes); - Building & Broadening Effect (Fredrickson).	Positive psychology interventions; SuperBetter.
Engagement & Actualization (Eudaimonic Level)	Engagement & Presence	- Flow Theory (Csikszentmihalyi). - Presence (Riva & Waterworth)	Challenge and Skills; Intrinsic and extrinsic rewards;
	Self Efficacy & Motivation	- Patient Engagement (Graffigna, Barello & Riva) - Self-Efficacy (Bandura) - Transtheoretical Model of change (Prochaska & DiClemente) - Self-determination Theory (Ryan & Deci);	Life summary; Online CBT study; Technology Mediated Reflection
Connectedness (Social/Interpersonal level)	Networked Flow	- Networked Flow (Gaggioli & Riva) - Psychological Selection (Delle Fave, Inghilleri, Massimini)	Presence and Social Presence Transformation of Flow
	Gratitude	- Psychology of Gratitude (Emmons & McCullough).	Gratitude visit; Gratitude journal.
	Empathy	- Emotional Intelligence (Salovey & Mayer; Goleman); - Affective and Cognitive empathy (Gerdes et al; Singer); - Compassion Focused Therapy (Paul Gilbert).	Role playing; Perspective taking; Emotion recognition training.
	Altruism	-Empathy Altruism (Bateson).	Prosocial games; Role playing helping behavior.

2.3.2 Positive Computing

Positive computing is another discipline that has emerged and developed with the advancement of human-computer interaction other than positive technology. With these advances in technology, the need to integrate wellbeing research into the design of daily software and products in a smart and precise way has emerged (Calvo, et al., 2016). As stated by Calvo, et al. (2016), positive computing has the same fundamental objectives as positive design and positive technology in terms of concentrating on the factors that enable to improve human flourishing in daily life. However, all of these approaches focus on different concepts when working on this issue. Both positive computing and positive technology are based on positive psychology, but positive technology focuses on personal experiences, while positive computing focuses on subjective experiences and subjective well-being (Downey, 2015). Positive computing is defined as “design and development of technology to support psychological well-being and human potential” (Peters & Calvo, 2014, p. 2).

Positive computing is ground on the self-determination theory to have a more experimental and scientific basis in achieving the goal of designing for wellbeing (Peters, Calvo, & Ryan, 2018). Self-determination theory (SDT) is a comprehensive approach that aims to understand human motivation and personality (Gaggioli, et al. 2017). As stated by Legault (2017), SDT claims that people's social environment should support basic human needs. It is therefore interested in people's relationships and their interactions with their social context, and also how they depend on it. SDT tries to specify necessary psychological nutrients that need to be supported for ideal motivation, engagement, and well-being (Peters, Calvo, & Ryan, 2018). Self-determination theory argues some basic psychological needs must be satisfied to enhance these and these needs are autonomy, competence, and relatedness (Deci & Ryan, 2000). It should also be emphasized that these three basic psychological needs specified by self-determination theory are measurable,

intrinsically rewarding, and safe because they cannot be overfill (Peters, Calvo, & Ryan, 2018). According to Riva et al. (2016), to satisfy these needs, some well-being factors have been addressed and various intrapersonal and interpersonal strategies have developed (Table 2.5).

Table 2.5. *Well-being factors for positive computing (Riva et al., 2016)*

	Well being factors	**Strategies**	**Methods and Measures**
Self (Intrapersonal)	Positive Emotions	Savouring; Positive ruminating; Reframing Compassion & meditation.	PANAS scales; General wellbeing measures such as SWB, SWLS and QoL scales.
	Motivation & Engagement	Intrinsic and extrinsic rewards.	The Motivation and Engagement Scale; Self-Regulation Questionnaires.
	Self-Awareness	Life summary; Online CBT study; Technology Mediated Reflection.	Emotional Intelligence measures (e.g. MSCEIT); Wellbeing measures such as Life Satisfaction.
	Mindfulness	Mindfulness meditation; MBSR strategies; MBCT strategies.	MAAS; Freiburg Mindfulness Inventory.
	Resilience	Positive psychology interventions; SuperBetter.	Resilience Scale.
Social (Interpersonal)	Gratitude	Gratitude visit; Gratitude journal.	Gratitude Questionnaire.
	Empathy	Role playing; Perspective taking; Emotion recognition training.	Empathy Quotient; Interpersonal Reactivity Index; Children's Empathic Attitudes Questionnaire.
	Compassion	Compassion; Meditation	Self-compassion Scale; Prosocial Orientation Scale; Hostile Attribution Bias Questionnaire.
	Altruism	Prosocial games; Role playing helping behavior.	

The first psychological need that self-determination theory focuses on is *autonomy*. Autonomy is described in different ways in various sources, but the most common definitions in SDT are as follows; it is being independent or self-governing, being able to think and behave independently (Calvo et al., n.d.). It is a concept of self-organization and self-regulation (Deci & Ryan, 2000). It is based on willingness, endorsement or volition (Peters, Calvo, & Ryan, 2018). However, autonomy is not only being able to behave freely. As mentioned by Peters, Calvo, and Ryan (2018), there are different factors that affect it. For example, an individual should be very willing to do an action, and this act must match this person's goals and personal values. As a result of such an act, high quality in behavior and performance can be observed. Various researches in the field of human-computer interaction (HCI) show that autonomy can be supported by technology design (Calvo, et al., n.d.). Technology design can create the feeling of freedom and control in a digital context in daily life by giving the right to decide on various tasks and set its own goals, personalize (Peters, Calvo, & Ryan, 2018). Examples of these technologies include assistive technologies, life-tracking technologies, productivity tools, and health management apps (Calvo, et al., n.d.; Peters, Calvo, & Ryan, 2018).

Competence is the second psychological need that self-determination theory is concentrated on. Competence can be defined as intrinsically motivated activities that provide feeling of capable and effective (Deci & Ryan, 2000; Peters, Calvo, & Ryan, 2018). As stated by Deci and Ryan (2000), it also supports the personal development of cognitive, motor, and social skills. Furthermore, satisfying the need for competence also helps to develop social interaction and physical survival skills. There are various factors that can be considered when designing technologies aimed at meeting competence needs, some of which are being challenged, getting feedback and chances for learning (Calvo, et al., n.d.). Different strategies can be applied in technology designs to satisfy competence. For example, there are two important factors that provide competence in game design. These are difficulty and novelty. According to this principle, a game should not be too easy or too hard to

keep people engaged and provide competence. For novelty, the design of a game needs to be changed frequently, new features, new levels, and rewards should be added which increase the mastery of the game and support the need for competence (Peters, Calvo, & Ryan, 2018).

The third and final psychological need that SDT study on is *relatedness*. Relatedness can be identified as a need for feeling connected, interactions with others and have a sense of belonging (Calvo, et al., n.d.; Gaggioli, et al., 2017; Peters, Calvo, & Ryan, 2018). Considering that people pursue most of their relationships with some kind of technology and at the same time most of the technological products have various type of social factors, relatedness has great importance in the studies of wellbeing and technology design (Calvo, et al., n.d.). Self-determination theory tries to create and evaluate various features of products such as video chats, cooperative features, emoticons, nudges to help to provide meaningful, satisfying and genuine relationships in contrast with hurtful connections (Peters, Calvo, & Ryan, 2018).

2.3.3 Positive Design

Nowadays, a large part of people's lives has numerous products, systems, and services that can form their lives in many different areas like how to access health care how to transport, how to communicate and connect with other people. The possible solutions that these designs provide to enhance the quality of life for many years have increased with the development of technology (Pohlmeyer & Desmet, 2017). Traditionally, design has problem-focused approach. However, a novel design framework offers a possibility-focused approach to provide a more extensive understanding, which is positive design (Casais, Mugge & Desmet, 2016). Another factor that has been effective in the emergence of positive design is the increase in the study of happiness and subjective well-being in the fields of psychology, philosophy, economics, and politics (Desmet & Pohlmeyer, 2013).

The positive design concentrates on designing positive experiences that are meaningful, valuable, and engaging to enhance subjective well-being and promote human flourishing (Casais, Mugge & Desmet, 2016; Desmet, Pohlmeyer, & Forlizzi, 2013). Positive design is a guide for designers to take into account the values that they should support and pay attention to these values in their design (Desmet, Pohlmeyer, & Forlizzi, 2013). In fact, each design tries to promote the subjective well-being of the user in any way. In doing so, either improve well-being or solves problems that prevent to improve well-being. However, the point that separates positive design from them is that target is deliberately determined at the beginning and it is intended to design for human flourishing, it doesn't happen by chance (Desmet & Pohlmeyer, 2013). The subjective well-being used in positive design studies means permanent and long-term happiness instead of momentary and temporary happiness (Desmet, Pohlmeyer, & Forlizzi, 2013). According to Desmet, Pohlmeyer, and Forlizzi (2013), when people have high subjective well-being, they are happy and grateful for the life they have.

As stated by Desmet and Pohlmeyer (2013), the positive design has three main components of subjective well-being which are pleasure, personal significance, and virtue (Figure 2.3). These three components are used as an ingredient when aim is to provoke subjective well-being. The positive design is where these three ingredients come together and if a design has all three of them that design fosters flourishing (Pohlmeyer, & Desmet, 2017). In a positive design that includes these three components, not all three need to be equally emphasized, while one may be more dominant, others can remain in the background (Desmet & Pohlmeyer, 2013). According to Desmet and Pohlmeyer (2013), these components are universal, but the main thing is how they are brought together and how they are used by designers.

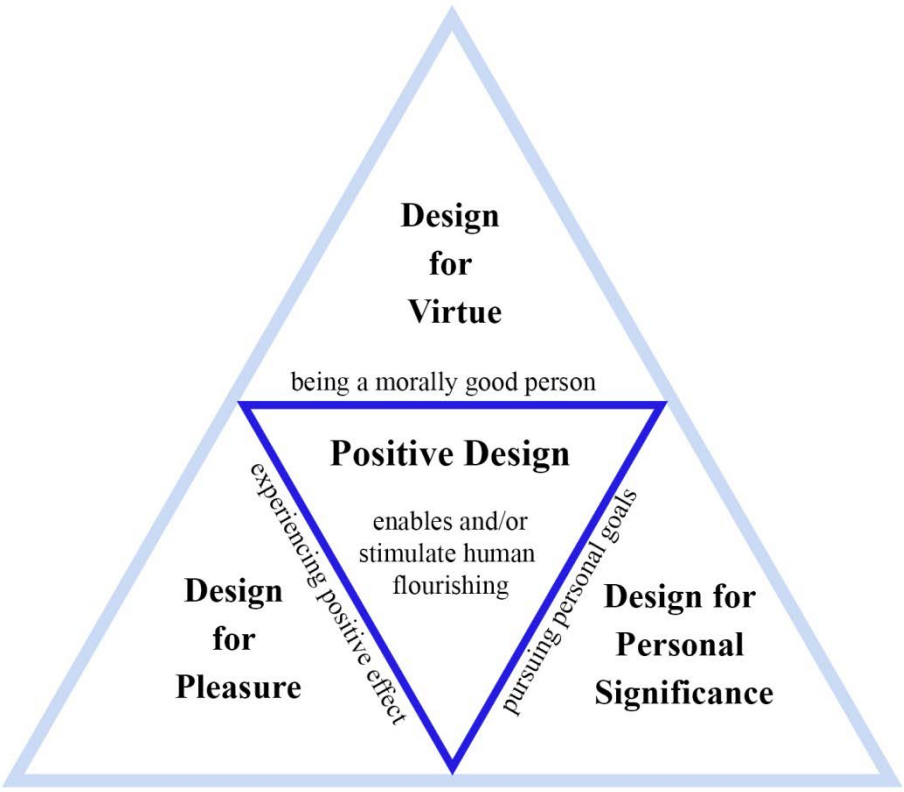

Figure 2.3 Positive Design framework (Desmet & Pohlmeyer, 2013)

The first component of positive design is *design for pleasure*. Pleasure is explained in the Oxford dictionary as 'the condition or sensation induced by the experience or anticipation of what is felt to be good or desirable; a feeling of happy satisfaction or enjoyment; delight, gratification. Opposed to pain' (Pohlmeyer, & Desmet, 2017, p.6). In this definition pleasure is a very broad concept. As stated by Pohlmeyer and Desmet (2017) the concept of pleasure, which Tiger (1992) has structured, has been grouped under four main titles by Jordan (2000) which can be used in the design discipline. Pleasures that arise from human-product interaction are as follows: physical pleasure which is related to sensual enjoyment, social pleasure which is related to relationship with others and community, psychological pleasure which is related to satisfying the mind and ideological pleasure which is related to human values and ideas. In this first component, happiness is described

as enjoyment in a certain moment that individual is in, and here, subjective well-being is achieved by the happiness brought by this instant pleasure (Desmet & Pohlmeyer, 2013). There are two basic strategies to focus when designing for pleasure. First of all, design itself can be direct source of pleasure, for example, a person can enjoy details of a handmade leather product, texture of sweater or smell of a new book. Secondly, design can promote positive experiences like people can enjoy sailing as an activity, not the sailboat itself. These provide a wider range of application options for designers (Pohlmeyer, & Desmet, 2017).

The second component of positive design is *design for personal significance.* This component of positive design contributes to the creation of designs promote subjective well-being of people by focusing on their long-term or short-term personal goals and values (Desmet & Pohlmeyer, 2013). According to Pohlmeyer and Desmet (2017), people tend to grow and develop, they want to discover their potential from birth, search for new challenges throughout their lives. They do so by setting goals for themselves. Products can be a helpful tool for them to achieve these goals. Having personal goals is important for a variety of reasons. First of all give personal goals help people to have purpose and meaning in life. A personal goal can keep people alive, gives direction to their daily lives, and provides something to work for. These goals also enable individuals to develop themselves. Some examples of these products are as follows; a musical instrument that enhances an individual's ability or a running shoe that allows a runner to develop his or her own techniques. In addition, some products contribute to this component by reminding people of their past goals. For example, having an environmentally friendly product can help people remember their success in protecting the environment, and an old dance shoe helps people remember their past success (Desmet & Pohlmeyer, 2013; Pohlmeyer, & Desmet, 2017).

The last component of the positive design is *design for virtue* which specifies moral side. Subjective well-being can be enhanced by having a virtuous life and a virtuous life can be achieved through design in various ways (Desmet & Pohlmeyer, 2013). Designs that aim to generate virtue can help people to structure

good characters by giving various instructions. For example, signs on a bus that show that some individuals should be given priority may provide conditions that allow virtuous decisions and actions. After a while, virtue will turn into part of a person's character so that virtue-driven designs will not be required. Individuals can then make virtuous decisions independently, but they can still be used to support these behaviors (Pohlmeyer, & Desmet, 2017). According to Pohlmeyer and Desmet (2017), therefore, the design has a more supportive role in this field for responsible and virtuous citizens to live better in the community.

In addition to these three basic components, there are also five characteristics to consider when developing a positive design. Positive design should be focused on possibility-driven approaches more than problem-driven approaches, it should decrease conflicts and provide a balance between pleasure, personal significance, and virtue, it should focus on personal fit instead of one-size-fits-all, it should support active user involvement, and finally, it should create long-term effects instead of short-term effects (Desmet & Pohlmeyer, 2013).

2.3.4 Positive User Experience

User experience (UX), as a new field, has gained great importance after advances in human-computer interaction and studies in this field have increased dramatically (Hassenzahl & Tractinsky, 2006). However, this field is often confused with usability and it does not have definition, principles, plan, and policy that are adopted by the majority (Law et al., 2007). The main reason for this diversity is that this subject was studied by lots of different disciplines for various concepts at different times (Law et al., 2009).

Although there is no consensus, the five most commonly used UX definitions have been analyzed to identify common points and differences under certain headings. This analysis was conducted to identify the requirements for the UX definition for

academics and practitioners of different disciplines (Law et al., 2009). These definitions are as follows:

"All aspects of the end-user's interaction with the company. Its services and its products. The first requirement for an exemplary user experience is to meet the exact needs of the customer without fuss or bother. Next comes simplicity and elegance that produce products that are a joy to own, a joy to use. True user experience goes far beyond giving customers what they say they want, or providing checklist features." (Nielsen & Norman Group, nngroup.com)

"UX is a consequence of a user's internal state (predispositions, expectations, needs, motivation, mood, etc.), the characteristics of the designed system (e.g. complexity, purpose, usability, functionality, etc.) and the context (or the environment) within which the interaction occurs (e.g. organizational/social setting, meaningfulness of the activity, voluntariness of use, etc.)." (Hassenzahl & Tractinsky, 2006, p. 95)

"The entire set of affects that is elicited by the interaction between a user and a product including the degree to which all our senses are gratified (aesthetic experience) the meanings we attach to the product (experience of meaning) and the feelings and emotions that are elicited (emotional experience)." (Desmet & Hekkert, 2007, p. 3)

"UX is the value derived from interaction(s) [or anticipated interaction(s)] with a product or service and the supporting cast in the context of use (e.g., time, location, and user disposition)." (Sward & MacArthur, 2007, p. 36)

"User Experience (abbreviated: UX) as the quality of experience a person has when interacting with a specific design. This can range from a specific artifact, such as a cup, toy or website, up to larger, integrated experiences such as a museum or an airport." (UXnet.org)

These five definitions from various perspectives were examined in five main groups. These are focus refers to primary emphasis that definition considers, who refers to the person that has the experience, what refers to thing that creates experience, how refers to the way in which experience emerges, when refers to the state at which the experience occurs (Table 2.6) (Law et al., 2009).

Table 2.6. *Perspectives and basic elements of the five definitions (Law et al., 2009)*

Definition	Perspective	Focus	Who	What	How	When
Nielsen & Norman Group, nngroup.com	Company	How to design for good UX	Customer.	Company, Its service and products	Level1. Meet exact needs Level2. Joy to use & own Level3. Beyond checklists	During interaction
Hassenzahl & Tractinsky, 2006	Evaluation	What shapes user experience	User	Psychological state. The system	Characteristics of the system and context	After interaction
Desmet & Hekkert, 2007	User	Types of product experience	User	Product	Gratified senses. Attached meaning. Emotion.	During/After interaction
Sward & MacArthur, 2007	Value-based	Value as interaction outcomes	Not well defined	Product or service and its supporting cast	Value derived from interactions	Before/During interaction
UXnet.org	Design-based	Types of artefacts	Person	Artefacts of various types	Quality of experience	During interaction

Since this research focuses on enhancing well-being through design by using positive psychology principles, Hassenzahl's approach to positive user experience is very important for this thesis. According to Hassenzahl, designers focus more on materialist representation of a product, but if they aim to enhance happiness with their design, they need to focus on experience design at the same time (Hassenzahl et al., 2013). He claims that experience is aroused by the interaction of some factors such as perception, action, motivation, emotion, and cognition into a mixed system with various elements such as place, time, people, and object (Hassenzahl, 2010). An interactive product has two types of perceived qualities, pragmatic qualities, and hedonic qualities. Pragmatic quality is also called do-goals and can be used as a broad definition of usability. For example, these are the elements that

make a phone call. Hedonic quality is also called be-goals and refers to values in a product that gives pleasure to its user (Hassenzahl, Diefenbach, & Göritz, 2010). As stated by Hassenzahl (2011), there is a strong link between hedonic quality and need fulfillment, and meeting some psychological needs is one of the main sources of positive experience.

There are many different theories about basic psychological needs. The most widely used one is Ryan and Deci's (2000) Self-Determination Theory. Later, Sheldon and colleagues (2001) made a study based on this theory and identified new ten basic psychological needs. With a questionnaire, Hassenzahl and his colleagues identified the six most promising and applicable needs among these ten needs (Hassenzahl, Diefenbach, & Göritz, 2010). These universal psychological needs are autonomy, competence, relatedness, popularity, stimulation, and security. Autonomy means that an individual is responsible for her/his own actions independently of any external power. Competence means that the individual feels very talented and effective in situations he/she faces. Relatedness means that an individual has good social relations and does not feel alone. Popularity means that an individual feels that she/he is admired, respected, and able to influence others. Stimulation means that an individual feels pleasure in life. Security means that an individual feels safe rather than being threatened (Hassenzahl et al., 2013). Designers can take these six psychological needs into consideration when designing interactive products that provide positive experiences (Hassenzahl, Diefenbach, & Göritz, 2010).

CHAPTER 3

METHODOLOGY

The aim of the field study is to understand habits, thoughts, and expectations of the m-health apps users due to their previous experience and investigate their daily interactions, concerns, usage patterns, and post-use opinions. For this purpose, a data collection process consisting of three different stages as pre-usage, usage and post-usage was designed (Figure 3.1). At this process, two qualitative data collection methods which are semi-structured interviews and online diary were applied with the participation of 15 people.

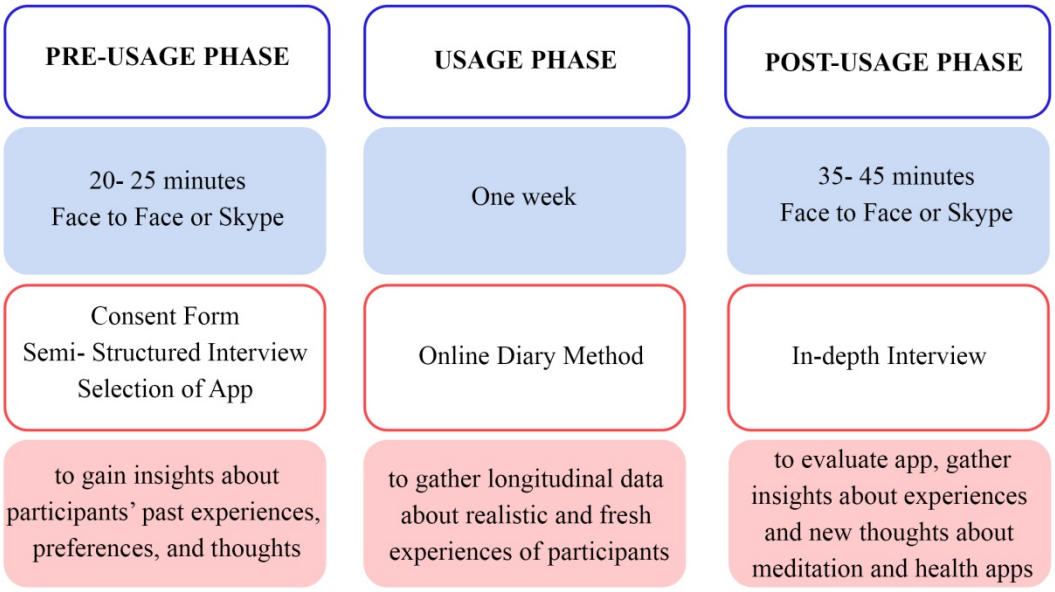

Figure 3.1. Structure of the methodology

3.1 Data Collection Methods

During the research, different qualitative research methods were used to collect the necessary data. These are semi-structured interviews and online diary methods.

Diary is a self-reporting research method that people record their thoughts, observations, experiences repeatedly in a specific period such as a day, or a week. A properly filled dairy prevents information loss and offers fresh and realistic data. Although diaries are categorized among qualitative methods, quantitative results can also be obtained (Sheble, & Wildemuth, 2009). Pen and paper-based diaries are the first examples of the diary method. In the pen and paper diaries, if the participants forget to fill the diary or find it difficult to fill, the information is forgotten. The information in the diary filled afterward loses its freshness and accuracy. However, as technology advances, the method of creating a diary using paper and pen was left behind and replaced by electronic and online diary methods. Diaries kept by electronic methods are easier to fill, have a high accuracy rate, and minimize data loss (Bolger, Davis, & Rafaeli, 2003). In the second phase of this study, electronic diaries that are consisting of multiple-choice and open-ended questions and created by using Google Forms were used.

The interview is one of the most used research methods that the interviewer gathers data straight from the interviewee. It is generally supported by other research methods, such as surveys and focus groups (Showkat, 2017). As stated by Showkat (2017), interviews are goal-directed and vital methods of collecting data about a particular group of people's thoughts, experiences, values, and any other aspects. Because of that, preparation of the interview schedule, implementation of the interview, and analyzing data should be carefully planned (Matters, 1998). Interview as important data gathering technique has three main types based on their structures such as structured, semi-structured, and unstructured interviews (Showkat, 2017). Semi-structured interviews consist of a number of open-ended

questions according to the topic chosen. An open-ended question helps to identify the topic under the study as well as allows the researcher and the participant to discuss various issues extensively (Matters, 1998). According to Matters (1998), when it is hard for the interviewee to answer a question, or the interviewee only gives a short answer, the interviewer may ask additional questions to help the interviewee to think further. In the first and third phases of this study, various data were obtained by using the semi-structured interview method. While preparing the interview questions, the information obtained as a result of the literature review and analysis of meditation apps were used.

3.2 Sampling Group

In order to participate in the study, participants had to meet some criteria. First of all, they had to have a smart mobile phone which has an iOS or Android operating system and they had to be familiar with using mobile apps. Participants were also expected to meditate regularly by using selected apps. For this reason, it was very important that they volunteer to meditate.

Snowball sampling method was used to find a specific group of people as participants of this study. As stated by Sedgwick (2013), snowball sampling is a non-random sampling method that a few selected participants reach other potential participants for the research. The method is called "snowball" because the number of sample members increases with time cumulatively. It is generally applied when participants are difficult to reach. Snowball sampling method is mainly consisting of two main steps. The first step is finding the first group of initial potential participants, which is only one or two people at the beginning, and the second step is asking those participants to find other people (Sedgwick, 2013).

As a result, 10 females and 5 males, totally 15 people participated in the research. Their ages ranged from 19 to 28. Participants were divided into 3 groups according

to their relationship with meditation. The first group consisted of 4 female and 1 male who are interested in meditation at a later level and who regularly meditate, the second group consisted of 3 female and 2 male who are interested in meditation but have not tried it before, and the third group consisted of 3 female and 2 male who had not been interested in meditation until this research. Three different experience-level user groups have been selected to identify differences and similarities in evaluations and expectations that can result from different experience levels. Furthermore, if a single level-specific app is desired to be created or an app aims to offer different options to different users within a single application these insights can be useful.

3.3 Selection of the Applications

A broad evaluation had been made in which many criteria were discussed for the selection of three applications to be used in the study. While making this evaluation, the most downloaded meditation applications in January 2019 were determined in the Android and IOS operating systems. As a result of this evaluation, 48 meditation applications, which are common in both operating systems, were selected to be examined. Then, diverse contents and sections of these meditation apps were examined, and the different features that they offered were analyzed. At this stage, in order to evaluate the applications on a broader scope, it was decided that the sections that should be common in all three applications were meditation, breathing exercise, and sleeping assistant. Besides, various messages/notifications sent to users by applications are another feature that was considered when choosing apps. After all, 14 meditation apps that provide meditation, breathing exercise, and sleeping assistant section and also daily messages/notifications feature time were determined. Since the language of the participants was Turkish, the languages of the applications were also taken into consideration during the selection. At the last stage, among these applications, three applications that offer these features in the most different interface designs

were chosen (see Appendix H). As a result, three meditation apps to be used in the study had been selected as Pacifica, Meditasyon, and Patika. However, while the study was in progress, Pacifica changed its name to Sanvello, and Meditation changed its name to Meditopia. These interface design differences can be listed as follows; Pacifica consists of a dynamic and moving background and all nature images, it has a vibrant but darker theme and a slightly more crowded presentation style. Meditation uses still pictures of nature abundantly, it has vibrant colors and has a lighter theme because it mostly uses white color and has a less crowded menu than Pacifica. Patika does not use nature pictures, it has soft colors and bright theme, it uses a lot of icons, unlike the others, and it has a simpler representation.

3.4 Pilot Study

A pilot study was conducted with a participant to make the necessary arrangements and improvements and also to control whether the stages were progressing smoothly before starting the data collection. Initially, it was expected to participants fill in the diary every day in a week, but in the pilot study, it was seen that the participant had difficulty filling the diary every day and did not want to meditate every day. Therefore, it was decided that it would be sufficient to fill the diary three times in total. In addition, it was determined that the participants should choose a medium such as Sms, e-mail or Whatsapp that would be most suitable for them to receive reminder messages to fill the diary. Finally, some necessary questions were added to the first and second stages while some similar questions were removed.

3.5 Procedure

The data collection process consists of 3 phases; Pre-usage, usage, and post-usage. The first phase is pre-usage and aim of this phase is to gain insights about participants' past experiences, preferences, and thoughts. The second phase is

usage and aim is gathering longitudinal data during usage about realistic and fresh experiences of participants. The third phase is post usage and aim of this phase is evaluation of the apps by the users and gathers information about their experiences.

3.5.1 Pre-Usage Stage

The first stage is a face-to-face or Skype meeting with the participant for the semi-structured interview. At the beginning of the study, participants were informed about the aim and procedure after that consent form was signed (see Appendix A for the Turkish and English version). After the participants signed to consent form, a semi-structured interview was conducted (see Appendix B for the Turkish and English version). At this stage, the participants were asked about their stress level in daily life, the reasons for their daily stress, their thoughts about meditation, their experience level of meditation, whether they used meditation app before, and their thoughts about mobile health applications. At the end of the semi-structured interview, participants were shown a card with some features and visuals of the selected three applications and they were asked to choose one of them to use for a week (Figure 3.2) (see Appendix F for the Turkish version). Then the participants were asked why they chose this application and what they expect from it. This process ended with the participants downloading and signing up for the application. The first stage was completed for a total of 20 to 25 minutes per user.

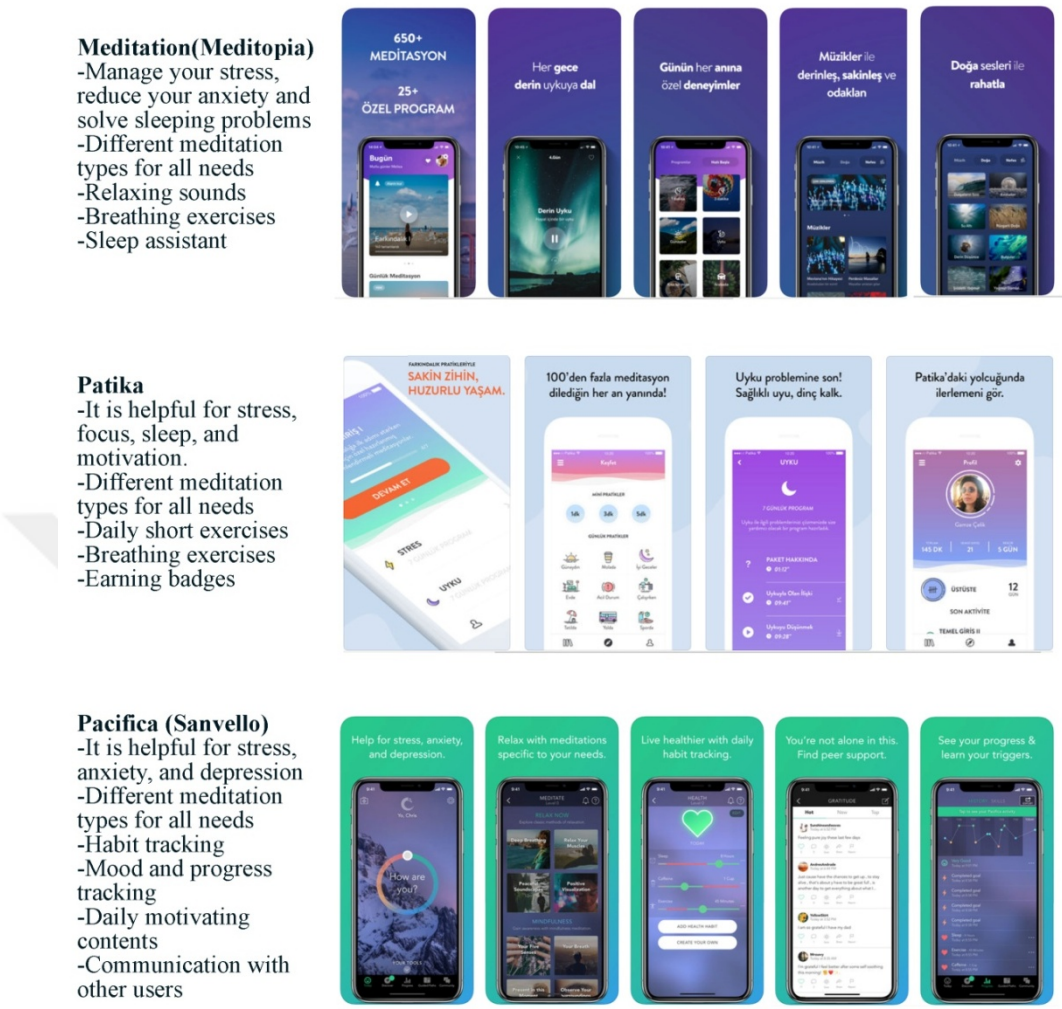

Figure 3.2. Meditation apps selection card

3.5.2 Usage Stage

In the second stage, participants used their application whenever they needed or wanted for one week and filled out an online diary (see Appendix B for the Turkish and English version). During this period, to remind meditating and filling the online diary reminder messages were sent to the participants from various mediums that they preferred such as SMS, Whatsapp, e-mail (Figure 3.3) (see Appendix E

for the Turkish version). After each participant filled out a diary, a new blank diary was sent to them so that each participant filled out the diary three times. At the end of a week, the date for semi-structured interview was arranged.

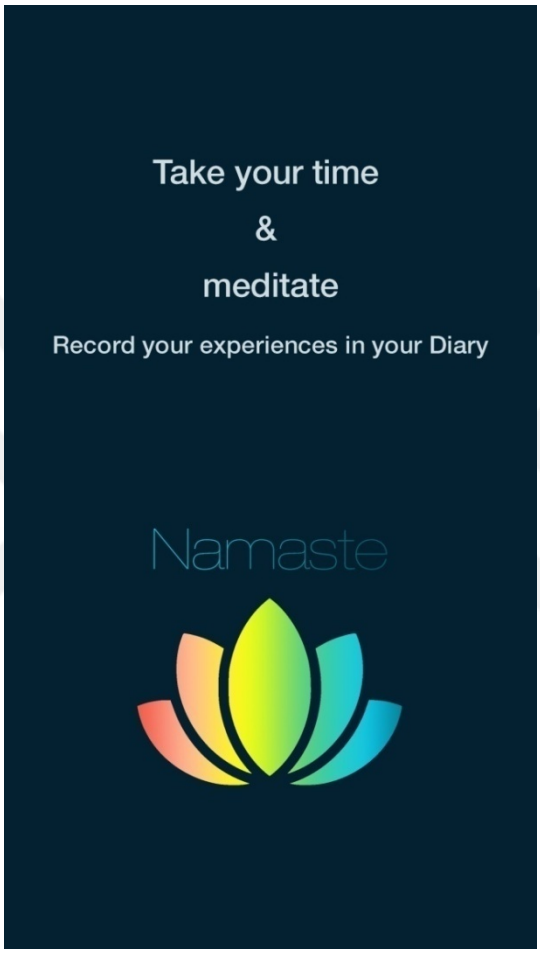

Figure 3.3. Online diary reminder visual

3.5.3 Post-Usage Stage

In the third stage, a semi-structured interview was conducted to evaluate the participants' perspectives about meditation after using the applications, their experiences about one-week usage, and their thought about apps in general (see

Appendix C for the Turkish and English version). Interviews were conducted face-to-face or via Skype according to the participants' demands.

During all interviews, audio recordings were taken with two different mobile apps for later analysis. The third stage was completed for a total of 35 to 45 minutes per user.

3.6 Data Analysis

A qualitative data analysis procedure was applied to analyze raw data. The first step was the transcription of the voice recordings in the form of a Microsoft Word document. Transcriptions were read several times, and repeated patterns were determined. In this way, the first stage codes appeared. Later, these codes were divided into groups according to their themes. Finally, they were gathered under certain categories (see Appendix İ). These are user, app, and environment and their relationships: user-environment, environment-app, user-app, and app-user-environment.

User category emerged as a result of the analysis of the semi-structured interviews in the first phase. Sub-themes under this category are participants' general mental health problems, causes of these problems, their own self-help methods to solve these problems, their meditation experience level, expectation from meditation, and their thought about why people meditate.

App category appeared as a result of the analysis of the data collected in the semi-structured interviews in the third phase. After reading the transcriptions obtained at this stage a few times, it was observed that the participants had detailed evaluations about the sections in the meditation app. Therefore, two main sub-categories were created in the app category as its sections and interface. Thus, the answer to one of the sub-questions of the study, "What are the strengths and weaknesses of current meditation apps?" was given in detail.

Environment category is also formed by the analysis of the semi-structured interviews in the third phase. One of the points mentioned in the meditation section of the literature review was the environment where the meditation was performed. Various knowledge about the environment in which traditional meditation was applied was mentioned. In order to evaluate the environment for meditation performed in the digital environment, a particular category was reserved in interviews. The collected data includes places where individuals prefer to meditate.

The relationship between environment and user appeared during the analysis of the semi-structured interviews in the third phase. According to the repeating answers, this category was sub-themed as to how they want the environment to be, the condition of the environment, and the modifications they made in these places.

Environment and app relationship has been analyzed with the data obtained from technology integration questions in the semi-structured interview in the last phase. Some repetitive answers were gathered under the sub-themes as changes that app itself can make in the environment or other technology integrations with the app.

User and app category was analyzed with the data collected in the first and third phases. It has been seen that some of the answers of users were repeating about the features that motivate them to use the application and make the experience of the users better. These are being user-friendly, being facilitative, being effective, being exciting, creating self-awareness, keep active involvement, being need-oriented, allowing personalization. Thus, one of the sub-questions, "Which characteristics of the meditation apps help to enhance positive experiences?" was answered.

In the app-user-environment category, with 45 meditation experiences collected with the online diaries in the second phase, meditation experiences performed in the digital environment were analyzed. In this phase, the options offered to the users were created with the knowledge obtained in the literature section. Thus, one of the sub-questions of the study, which is "What are the characteristics of the meditation experience that are practiced through mobile technologies?" was answered.

CHAPTER 4

FINDINGS AND DISCUSSIONS

This chapter presents the analyses and the findings of the field study. This chapter presents the results of the analyses and the findings of the study. Firstly, research analyses were evaluated based on three main factors: user, app, and environment and their relationships: user-environment, environment-app, user-app, and app-user-environment (Figure 4.1). In conclusion, field research analyses were discussed through positive psychology theories.

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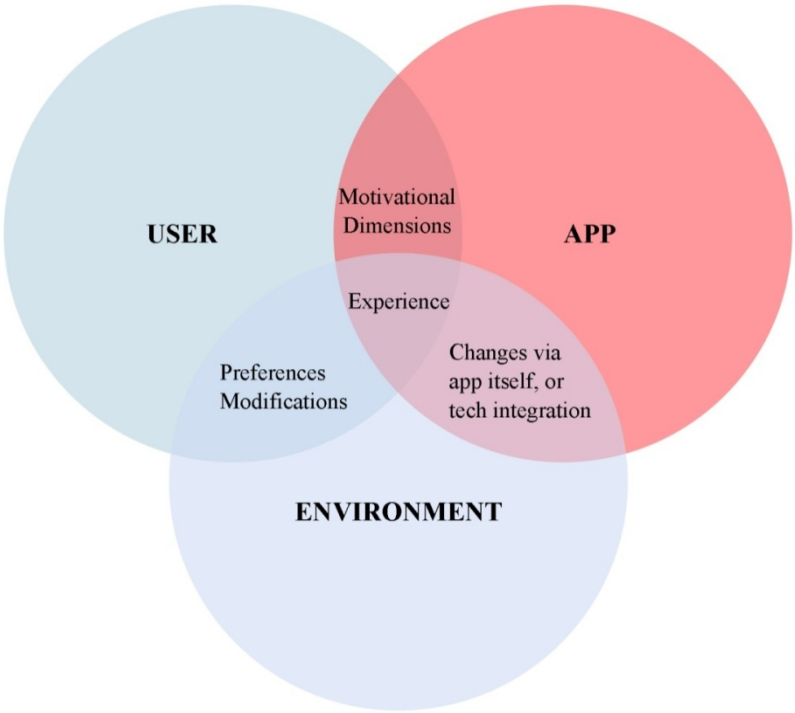

Figure 4.1. Structure of the findings

4.1 User

In the first phase of the study, various information about fifteen participants were gathered. This information was collected under the titles of common problems participants have and the causes of these problems, their self-help methods, their expectation from meditation, and their meditation experience level.

According to results, the common problems that participants face in their daily lives for various reasons are anxiety, sleep problems, stress, and various concentration problems (can be seen in Table 4.1)

Table 4.1. *Various problems of participants*

Anxiety	6
Sleep problems	8
Stress	14
Concentration problems	7

When the causes of these problems were asked to the participants, they emphasized future concerns, education, responsibilities, working life, and social life (can be seen in Table 4.2).

Table 4.2. *Causes of these problems according to participants*

Future Concerns	5
Education	10
Responsibilities	3
Working Life	5
Social Life	2

After that, participants were asked their self-help methods of coping with these problems, they said that they prefer meditation, yoga, breathing exercises, socializing or engaging with some hobbies such as reading, cooking, watching TV series or movies, cleaning, or sports. While looking for a solution to a problem, some of them said they ask people around them for advice, and some of them said they are looking for a solution on the internet before going to the doctor (Table 4.3).

Table 4.3. *Self-help methods participants use*

Meditation	3
Yoga	4
Breathing Exercises	3
Socializing	2
Hobbies	8
Ask for Advice	3
Solution on the internet	7

When the participants were asked what they expect from meditation, answers were curing sleeping problems, relieving pain, regulating breath, feeling better, reducing stress and concentration problems, enhancing inner peace, relaxation, and motivation. Therefore, some of them mentioned that they have seen it as a complementary activity after yoga (Table 4.4).

Table 4.4. *Participants' expectation from meditation*

Curing Sleeping Problems	6
Relieving Pain	2
Regulating Breath	3
Enhancing Inner Peace	2
Reducing Stress	10
Enhancing Relaxation	8
Increasing Concentration	5
Enhancing Motivation	2
Feeling Better	4
Complementary after Yoga	3

Finally, participants were asked about their meditation experience level, five participants stated that they regularly practice different types of meditation, five of them said that they tried only one or two times or wanted to try meditation but did not have opportunity, five participants stated that they had never tried to meditate before, because they thought that meditation is a very difficult practice and take a lot of time and effort.

4.2 App

In the app part, the features of the meditation apps were analyzed in terms of content and interface.

4.2.1 Content

In the content section, all the common and non-common parts of the three meditation apps were examined under the titles of meditation, sleeping assistant, breath exercise, past use records, community, reminder, motivational messages, relaxing sound, splash screen, and questionnaire/mood assessment.

Meditation

Meditation is the most fundamental section of these applications. As a result of the field study, the factors that need to be considered in the meditation section were determined. These are variety of meditations options, level of meditations, meditation in sessions, type of meditation exercises, personalization options, information parts, searching part, and updating meditations.

Eleven participants emphasized the variety of meditation within the app. Every user enter the meditation app with a different purpose. For example, users may have very specific problems of unhappiness, loneliness, pain, or concentration. It is among the basic expectations of the users that there should be different types of meditation in more specific subjects to more general subjects. In addition, meditation for special occasions such as before the job interview and before the exam, or in different places, such as at the public transport, in the library are among other expectations of users.

> "An application needs to be able to respond to something about my current mood. For example, maybe I need motivation, I'm unhappy, I'm crying, or I have a headache. If it can give me a choice, it would be more effective." (P1)

Four participants stated that they had difficulty finding the meditations they were looking for. Therefore, it would be better to have a search button in the meditation section where users can search for the topic they want in all the meditations in the app, and once the user has found the topic they need, they can choose the one that is more appropriate for them.

Another important factor that emerged after using meditation apps was the level of meditations. For example, four participants who have already experienced in meditation would like to have more advanced level meditations, while two participants who have not had much experience in meditation previously, wanted to have a beginner level of meditation. It was also recommended by less experienced users that meditations can be progressed from simple to advanced level while more experienced users stated that there should be more technical meditation within the application.

Four participants have said that even if the content inside the application is sufficient, they can try it all out over time and run out of material. Besides, five participants stated that the same exercises were performed in different meditations. This makes the application boring, and the user stops using it after a while. According to the participants, the content of the app should be updated frequently, new content should be added, and the exercises performed in the meditations section should be differentiated.

> "Although the subject changed, the concept was always the same. For example, to wake up or to sleep, something was told with some background music. I've been waiting for different concepts to sleep, and different concepts to wake up." (P12)

Another feature that was prominent during the analysis was that the meditations were in sessions such as several daily, 7-day, and 21-day meditations (Figure 9). Ten participants stated that they would prefer to have a meditation session. In this way, they feel like it is a course and something that should be continued. It also makes users wonder what will happen next session. This has a motivating effect for the user to continue to use the app. The participants stated that they felt like they have achieved a few things and that they should complete the rest. They also mentioned that they knew what to choose next time and that it was more efficient than choosing something random. However, seven participants also point to the need for a single session, quick, more practical meditations, such as at home, at school, on the road, in the evening and in sports (Figure 4.2). Therefore, sometimes

they can be more excited to get out of that continuity and try something else. The display of these sessions as a process with various graphical representations and showing the completed parts as full and the incomplete parts as empty are mentioned as features that increase the sense of success and the sense of continuation.

> "I did not prefer to do meditation in session because they were looking very professional. They also had very professional names. Since I'm just a beginner, I chose to do one-time meditations, and I thought I could not meditate for 11 days." (P12)

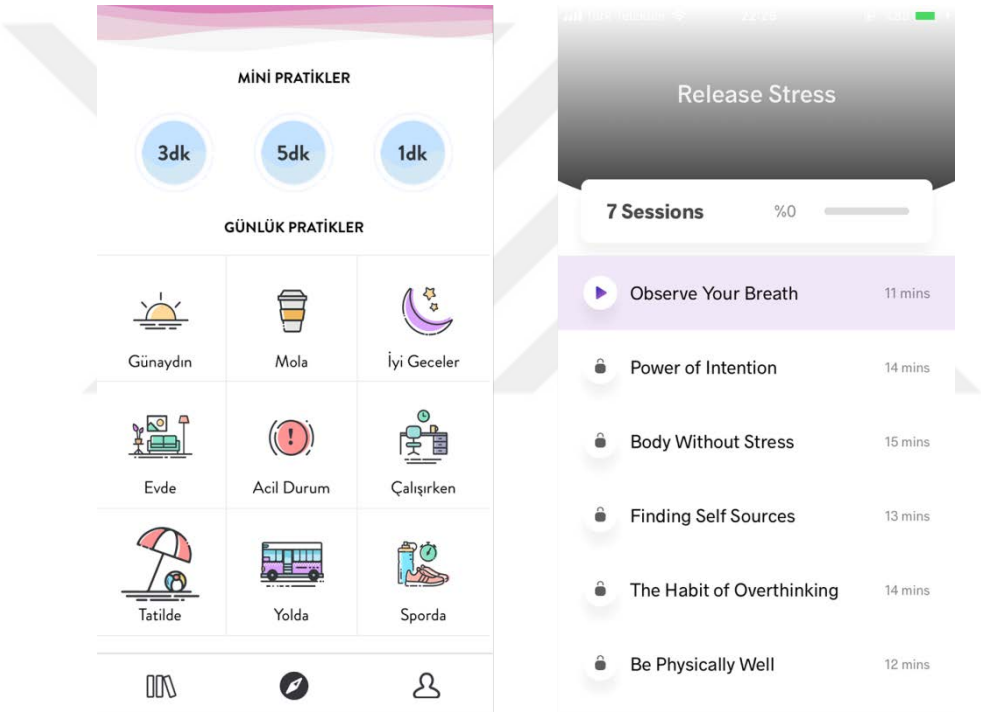

Figure 4.2. Quick meditations (Left App: Patika); meditation in sessions (Right App: Meditasyon)

Meditation is a very personal application. The ideal options for each user while meditating may vary. Also, a user may not always want to continue with the same choices. For these reasons, all fifteen participants stated that being able to

determine various options is among the features that increase the satisfaction of the users.

During the field study, elements that can be personalized in the applications were determined. These are narrator's voice, background sound, background image/theme, and meditation duration. The feature that ten participants would like to personalize is the narrator's voice. The reason for this is that they thought it was boring to listen to the same voice all the time, while others said they found the narrator's voice irritating and not suitable for meditation. Users stated that it was more efficient to support meditation with relaxing music. However, as thirteen participants noted what sounds they find relaxing varies from user to user. Also, participants mentioned that they had chosen a few most appropriate sounds between various options and listened to them all the time. They stated it is vital that the application does not offer standard fixed music to the user, but instead provides a variety of options.

Users with various levels of meditation experience used the app for different reasons in different locations and at different time duration. These were the factors that determined how many minutes they could spend while meditating. For example, a very experienced user stated that she/he was meditating for longer periods, while a less experienced user said that she/he could meditate in short periods. Some users also needed to use the app when they had very little time. For such reasons, seven participants said that they found it useful to have different options for meditation duration. Only three participants specified that it was important to be able to change the background image/theme. The majority stated that they closed their eyes or did not look at the phone while meditating, so changing background contact was not very useful. However, even though personalization has been specified to be an essential feature for all users, too many options to set out can be negative for users. In particular, users who are not very experienced have stated that they cannot decide what to choose, while others said that it is time-consuming to make too many adjustments (Figure 4.3).

"I may often be meditating, or I want to start meditation right away. In this case, it is slow to set more that one option and too much workload. If you have time, you can examine the application thoroughly, and you can adjust all of them. It may also be an option for situations where there is no time like quick meditation." (P5)

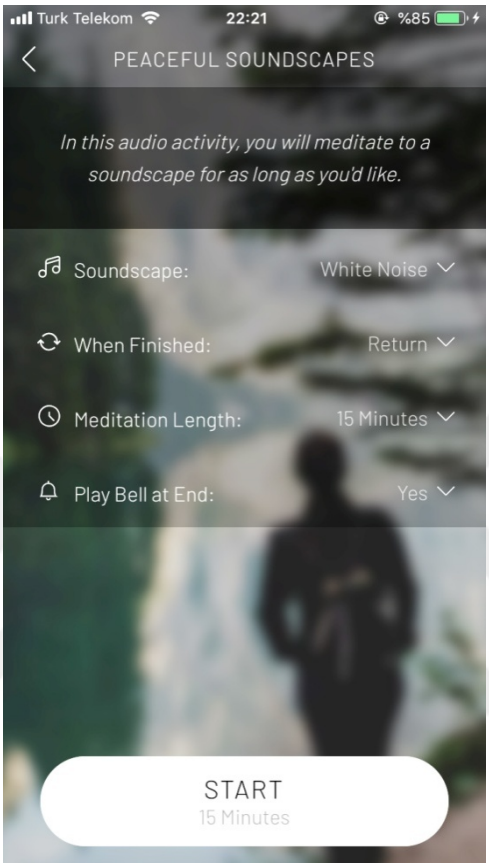

Figure 4.3. Personalization examples in meditation section (App: Sanvello)

Eleven participants stated that they would prefer to have an information part in the meditation section. Individuals with every level of experience can use meditation apps. The participants indicated that this information would be useful. However, they stated that this information should be more about how to meditate. Only four highly experienced and interested participants reported that they would prefer to have access to more technical information. The majority of the participants stated that they would prefer not to have this information in writing but would prefer graphical representation, photography, video, or audio narration, and they should be presented to them shortly and clearly.

Sleeping Assistant

All three of the apps had a sleep assistant section in different ways. The purpose of these sections is to relieve the user with varying strategies before sleep. There are two critical elements in the sleep assistant section. These are the things that a narrator tells the user to relax, and the second is background music. In the Patika app, there was only a narrator option but in the Sanvello and Meditasyon apps, there was a narrator and music, only a narrator or only music options.

As a result of the analysis, comments were gathered around four topics. The first was being able to turn the narrator's voice on and off. Four participants have indicated that they prefer to use only background music as a sleeping assistant. However, if a participant wanted to sleep only by listening to the music, they had to leave the sleep assistant and switch to the different music section in some apps. The second topic was background music. In this part, nine participants mentioned that fire, rain, and ocean sounds or instrumental sounds are relaxing and effective. Two participants said they would prefer to add their favorite music here. Another element was to create a playlist. Four participants have reported that creating a playlist is more effective than listening to the same sound for a long time. The last feature is the duration of the sleep assistant. A user stated that the sleep assistant was still in progress when she/he woke up in the morning and said she/he would prefer to have it set.

Breath Exercise

After the meditation and sleep assistant, the other section that users use to relax and calm is the breathing exercise section. In this section, it is aimed to reach the users' goals with the right breathing techniques. Differences in this section between apps were generally related to the guidance technique of breathing exercises (Figure 4.4). In the Patika app only a narrator directs user as breathe and exhale, in the Meditasyon app there is only a graphical guidance as growing and shrinking circle and in the Sanvello there is both a graphical and voice guidance and also in this

application, various personalization about duration and background sound can be made in section.

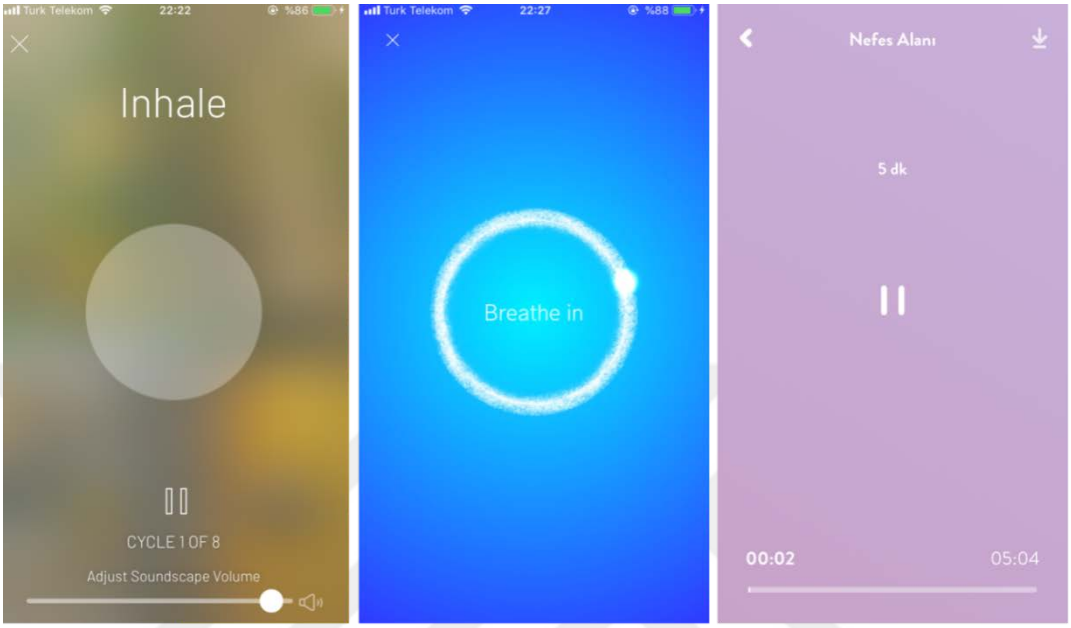

Figure 4.4. Breath exercise guidance examples (Left to right Apps: Sanvello, Meditasyon, Patika)

After the participants used these three applications, several common issues emerged related to breathing exercises. Ten participants stated that only a narrator's instructions as breathe and exhale were not useful. It was challenging to follow, and it was not clear how fast to breathe and exhale. They said that graphical guidance was easy to follow and more useful. However, seven participants stated that they closed their eyes or wanted to close their eyes while doing the breathing exercise. Therefore, they indicated that voice guidance, along with graphical guidance is the most effective method. Besides, one of the participants said that notifications in the form of 'stop and breath' coming during the day could take the user out of the daily routine and it could be an exercise that relaxes users during the day.

> "It was not enough for the narrator to say breathe in and breathe out. Instead, there may be voice guidance that can breathe with me, when the narrator said now we are breathing; I could not manage my breath properly. These graphics were helpful, of course, but it can be an audio version additionally." (P2)

Past Use Records

One of the most critical differences in using the app from meditating with traditional methods or watching meditation videos is that it keeps past use records. With these apps, users can track which days they meditated, how many minutes they meditated, how many days they meditated, how many days in a row they meditated, how many sessions they have completed, how they felt in the past, how they felt before and after meditation, how they progressed and changed.

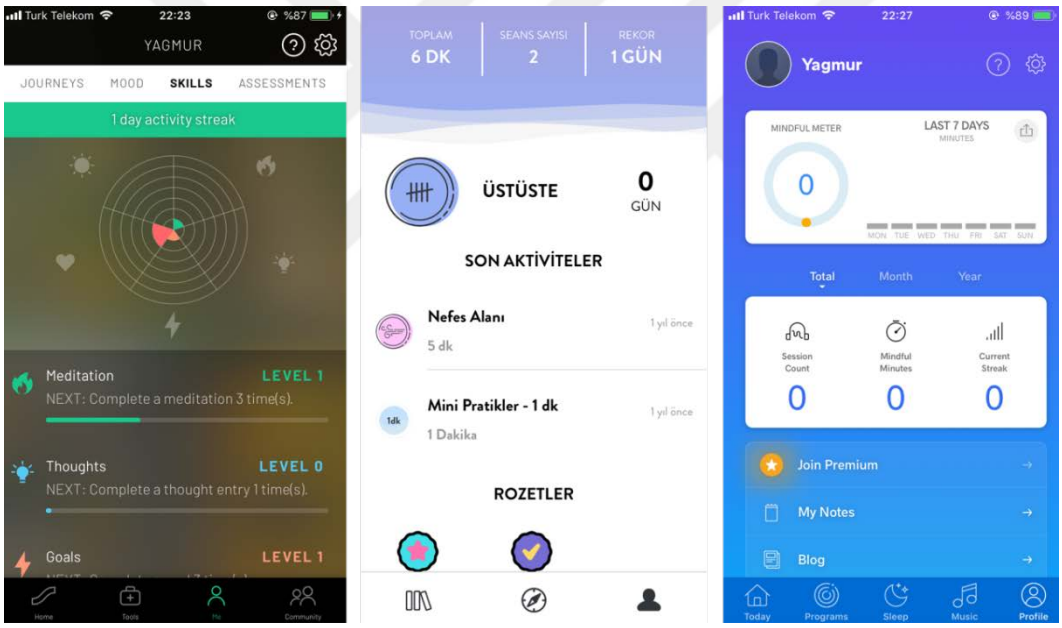

Figure 4.5. Past use records examples (Left to right Apps: Sanvello, Patika, Meditasyon)

Most of the users stated that they expect a health app to make some changes to them. Twelve participants said that the most effective way to understand this is to see changes or progress, whether it increased or decreased clearly with a graph. However, it was repeated by many participants that type of graphical representation

was significant (Figure 4.5). For example, in one app, there is a heart that fills up as users meditate. One of the users mentioned that filling it is not enough for her/him; she/he wants to see the change as positive or negative values. They said that seeing the previously completed part in a graph makes it look like a continuous process and that they want to continue using the app. Also, six participants stated that seeing meditated for several days as a streak motivates them. In an app, streak means creating a chain by using an app regularly, and a ring is added to the chain each time the user uses it. Streak starts from zero when users break the chain. For example, they said that they thought like I had completed it for a few days, and I should continue and not break the streak. Besides, some participants noted that they continued to use the app because they wondered how many days they could meditate in a row. In addition, six participants said they would like to see records of moods of any previous day and records of moods before and after meditation. They stated that this is important for raising awareness. One participant also noted that the graphical sending of records of uses to users with a notification is motivating to continue to use the app.

> "This makes sense to me, and it motivates me to continue in a positive way because some days, I do not want to meditate, but if I meditated four days in a row, I do not want to break this thing, and I would meditate on the 5th day." (P1)

> "They put a heart in there, and it fills the heart as you meditate daily, but it's not enough for me to fill that heart. I would like to see that change as a chart if it increased or decreased" (P2)

Community

In the Patika app, there was no community section; in the Meditasyon app, there was a community section only shows the number of people meditating right now, and in the Sanvello app, there was a more active community section where users can share ideas and sent likes (Figure 4.6).

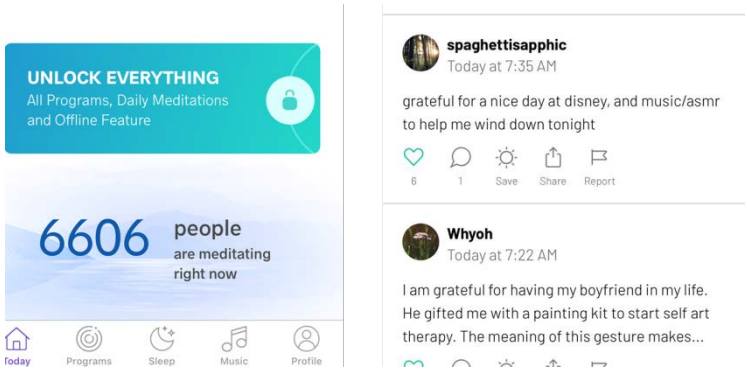

Figure 4.6. Different information in community sections (Left App: Meditasyon; Right App: Sanvello)

Thirteen participants stated that meditation is not an appropriate way to socialize or to communicate with other people. They said that meditation is a very individual activity, and a meditation app is a personal field. In the community section, it was exciting and motivating to see information such as a number of people meditating now, today or duration people meditated today. Only four said it could be exciting for them to contact a friend. However, they also stated that this feature should be limited, and it would be enough to have the information that a friend is currently meditating or a friend meditated today.

Reminder

All three apps have a kind of reminder that can be set (Figure 4.7). While six participants stated that they did not set a reminder, nine participants said they had set it. However, six of them also mentioned that they did not meditate at those times. Those who took reminders from the app at a random time, and all participants who set a reminder at their desired time, stated that it was inefficient to set up a reminder for meditation because to use a meditation app, a user had to be ready, feel good, and have some free time. Otherwise, they would postpone the reminder if they had a job. Twelve participants also mentioned that the reminder

should not be sent frequently, but only a few days a week to remind users to use an app.

Figure 4.7. Reminder examples (Top to bottom Apps: Patika, Sanvello, Meditasyon)

Motivational Messages

All three apps send motivational messages to participants in various ways. The Patika and Meditasyon apps send various standard motivating quotes while the Sanvello app sends 'How are you feeling?' message to allow self-evaluation of users to create awareness (Figure 4.8).

Figure 4.8. Motivational messages examples (Top to bottom Apps: Sanvello, Patika, Meditasyon)

The participants had a wide range of views on motivational messages. Four participants said they found these messages ineffective. The other participants stated that they found it useful, but these messages should be short, easy to read, and creative, but also, it would be irritating to take too many of them. Besides, those who find it useful said that the content of these messages is crucial. Some noted that standard messages could be annoying; these messages need to be manageable and have something to do with the user's problem to be motivational, while others prefer them to be random and suggest more general, thought-provoking quotes that allow self-improvement. Also, two participants said that these messages could be a graphical representation of data on users' changes and progress. Those who find these messages motivational mentioned that these messages take them away from the stress of the day in a short time and relax them.

Rewards

Rewards are things that are submitted to users in different forms when users complete a task or accomplish something. In the Patika and Meditation apps, rewards are in the form of badges, while in the Sanvello app, rewards are in the form level increases and opening of the locked sections.

When participants were asked about their ideas about winning rewards in meditation apps, eleven of them said that the award-winning system was not suitable for meditation apps. These participants stated that meditation practices should not become a race, and they entered the app to relax, and they did not want to deal with anything else. Three participants mentioned that winning things like cups, badges, or stars doesn't motivate them, but if there's going to be a reward system, it should be something about meditation. They stated locked meditations could be opened, a surprise meditation could be gained, or new sections could be added, as an example.

> "I think it is not right to try to earn such a badge for the meditation apps. Therefore, I wouldn't use it to win a badge. I'm already using it to relax, why would I do it like something more compelling to myself." (P4)

Relaxing Sound

Relaxing sound section is a prominent part of meditation apps. When three applications were examined, the Patika did not have such a section, and the others had both nature sounds, various kinds of music, and white noises. These sounds can be placed under a separate section in meditation apps, as well as background sounds in other sections such as meditation, sleep assistant, and breathing exercise.

When the participants were asked to examine these sounds, almost all of them said that these sounds were effective and relaxing for meditation, sleeping assistant and breathing exercises. The users of the app that does not have any relaxing music indicated that it would be better to have such sounds; otherwise, it was a little bit boring. However, the important thing was the diversity of these sounds. It turned out that the more varieties, the more likely they were to find the right one for them.

Four participants have said that creating a playlist could be more effective than playing the same sounds all the time. Besides, three participants said they would prefer to be able to send their favorite music from various platforms into a meditation app.

Splash Screen

The three apps examined during the study had different splash screens. The Patika app had the text 'Take a deep breath'; the Sanvello app was asking, 'How was your week,' and suggesting meditation accordingly, and the Meditasyon app did not have any special message (Figure 4.9).

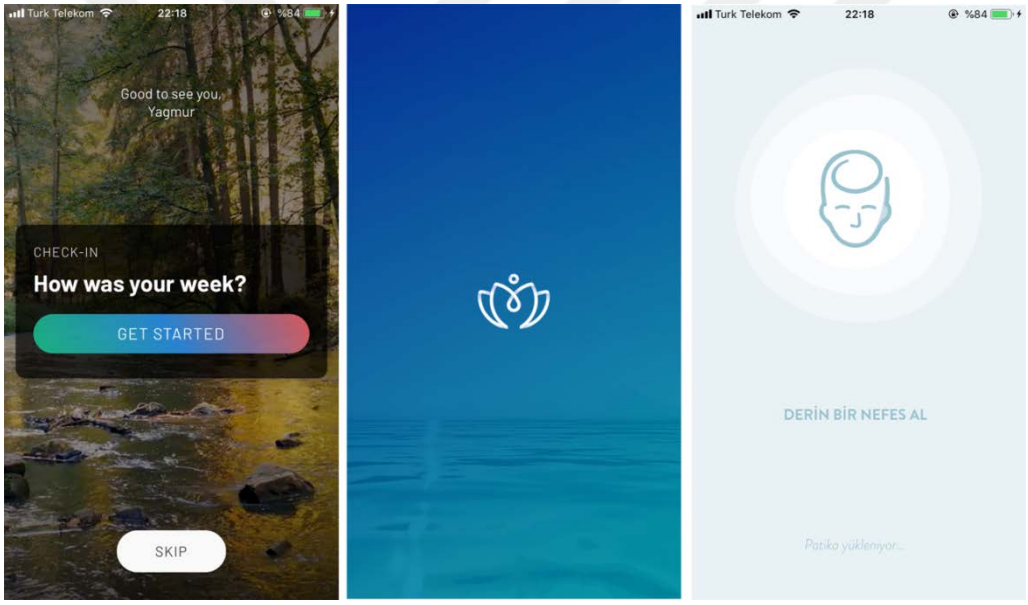

Figure 4.9. Splash screen examples (Left to right Apps: Sanvello, Meditasyon, Patika)

Users of apps that have something on the splash screen said that it felt good to encounter something like this, and they found it motivating. Those who came across 'How are you feeling?' question said that it made it feel like one-to-one communication, and it felt like something special to them. Those who encounter

'Take a deep breath' text noted that that was preparing them for practice rather than directly starting.

> "When I click on my phone to enter the application at the beginning, there was writing that says take a deep breath. It was so nice that in an effortless way, it was preparing you to practice even when it was loading." (P3)

Questionnaire/ Mood Assessment

The Questionnaire / Mood Assessment section is located either directly at the entrance of the app or in a separate part within the app where the users are asked questions about their day or how they feel at that moment. As a result, the application suggests a meditation based on the user's response. When the apps used in this study were examined, it was observed that only the Sanvello app had such a Questionnaire / Mood Assessment section. (Figure 4.10)

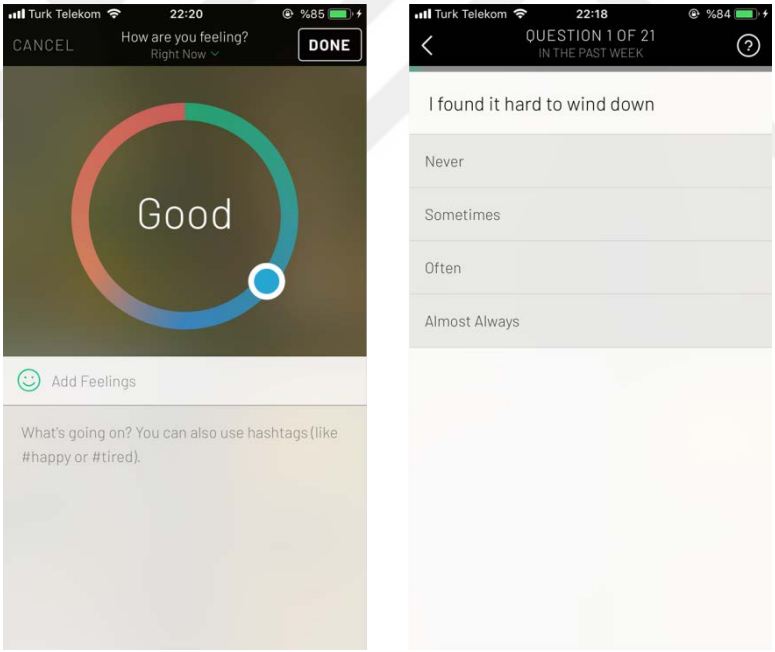

Figure 4.10. Mood assessment and Questionnaire (App: Sanvello)

Eight of the participants stated that this section should be included in the meditation app, and if they did not enter into the app for something particular, they mentioned that they used these suggestions. These participants even said that it was sometimes difficult to decide which meditation they should choose, and in those cases, it could be a better option to select that suggestion directly.

4.2.2 Interface

In the interface section, the theme visuals and usability features of meditation apps were analyzed based on three apps that were investigated in the study.

Theme Visuals

All three of the app used during the study consisted of different types of visual themes (Figure 4.11). The Patika app consisted of soft colors and icons, the other two bright and vivid colors, and nature photographs. However, the Meditasyon app included steady nature photographs, and the Sanvello app contained moving photographs of nature.

Five of the participants stated that they prefer soft color apps, they want to see simple visuals, and they do not want to see anything tiring. Ten users said that they prefer to see nature photos in the meditation apps. They said that they forgot that they were meditating using technological tools thanks to nature photographs. They also noted that nature photographs such as starry sky, forest, and sea give people happiness, and seeing a piece of nature makes them feel peaceful.

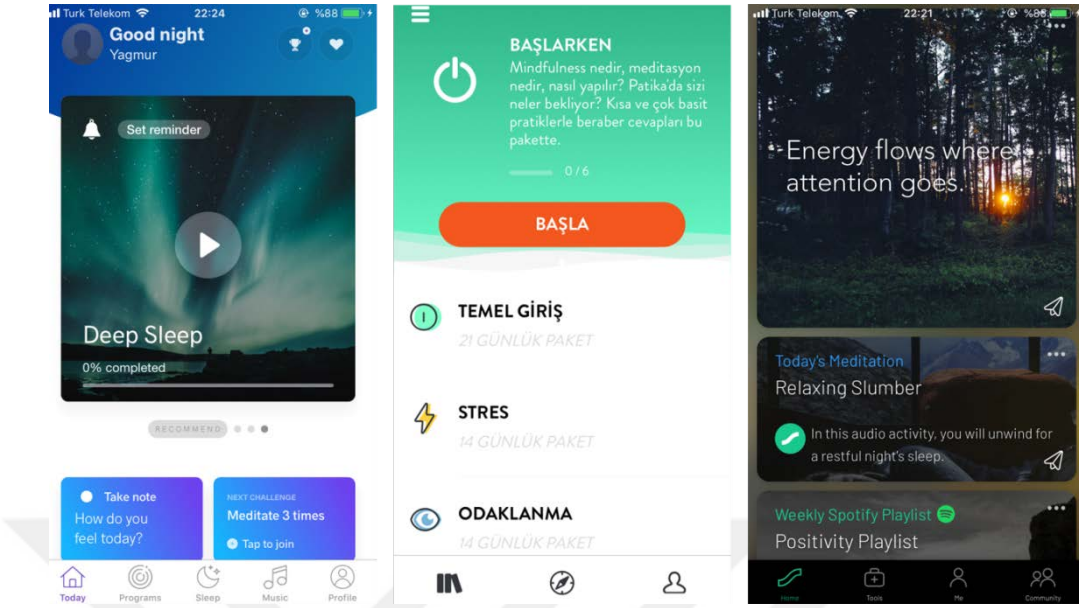

Figure 4.11. Main page visuals (Left to right Apps: Meditasyon, Patika, Sanvello)

Usability

During field study, common issues that emerge about usability are categorization, understandable and straightforward headings, recognizable icons, less setting, color guidance, search options, and fewer steps before reaching the target. At first, the participants stated that they expect to see everything clearly on the main page. The main things should be on the home page and easily found. Everything should be gathered under the relevant headings, and the headings and also icons should be understandable in a way that every user can understand. Eight users stated that the categorizations within the app should be carefully designed, and being able to easily choose whether to meditate, sleep, or breathe makes it easier to use. Six users said that since the goal is to open a meditation, they did not want to go through too many steps and wanted to reach the goal quickly. Five users said that too much option to set before starting meditation makes it difficult to use. Four users added that adding a part of a search button to the app will help find what is wanted and make it easier to use the application. Other features mentioned by the

users were that the sign-in section should be short and clear so that it could be easy and quick to reach the main screen, and the color of the completed things should be changed so that it would be clear where to proceed later.

4.3 Environment

In the first stage, before using apps, the participants were asked in which environments they thought meditation could be practiced. Participants stated that they believe that home, nature, outdoor, public transportation, meditation center, and yoga center are suitable environments for meditation. When in other stages, after using apps, users were asked which environment they used to meditate, all fifteen users said that they meditated at home, and also two participants noted that they meditated in public transport, and one user said that she/he practiced it in the library.

4.4 User-Environment

The relationship between user and environment was analyzed under two topics. These are the user's preferences and the user's modifications in the environment.

4.4.1 Preferences

Participants were asked how they prefer environmental conditions when they are meditating. Twelve of the participants stated that the environment in which they would meditate should not be crowded. All of the participants mentioned that they want to meditate in a quiet and calm environment, and also, the environment should be away from all disturbing external stimuli. Besides, ten participants said that when they were meditating, they wanted the atmosphere to be dim or dark.

4.4.2 Modifications

As a result of the questions about whether the participants made modifications in their environment while meditating, it was revealed that five participants did not prefer to change anything in the environment, and ten participants made various adjustments in the light. Some participants also stated that they had made more specific arrangements. For example, three participants mentioned that they cleaned the environment before meditating because they could not meditate in a scattered environment while one participant said that she/he put various plants in the environment before meditate, and it feels better.

"It is important to me that the environment is organized, not scattered. I could not focus if I knew around was messy. I also feel better when I have a few small plants with me, and because of that, I brought some plants in the living room, closer to me, to feel like in nature." (P7)

4.5 Environment-App

Users were asked questions about new features that could be added to the app itself and new technology integrations to improve apps and enhance the user experience.

Four of the participants said that some kind of light that the application would give to the environment could increase their motivation and experience. In fact, for example, when users listen to ocean sound while meditating, blue light, or when users listen to fireplace sounds, an orange light that comes from the phone can be useful.

When users were asked what technology integrations could improve their experience, five participants said that the smart-watch and the app could be combined. Furthermore, with this technology, the heart rhythm and breath of the user can be monitored, and the application can guide the user according to this information. Eight users said that smart lighting technology could be combined

with the app, and the lights of the room could change according to the selected themes or sounds.

In addition, two users said that combining technology and app would reduce the spirituality of meditating, while three users said that additional things would require a lot of effort, and they would not prefer it.

4.6 User-App

In this section, where the User - App relationship was questioned, eight motivational dimensions of the meditative m-health apps were determined. These are being user-friendly, being facilitative, being effective, being exciting, creating self-awareness, keeping active involvement, being need-oriented, and allowing personalization.

Being Effective

People expect health apps to make them mentally or physically better than before, and if they have specific problems, find solutions to them. Meditation apps also promise users to reduce stress and anxiety, help sleep problems, make them relax, and increase concentration. All fifteen participants stated that the most crucial factor in continuing the meditation app was that it was effective and beneficial for the user. If they see results and changes, people's motivation increases, and they continue to use the app.

Being Facilitative

People spend considerable time and effort while they are trying to find solutions to health-related problems. For those who want to meditate, if they choose traditional methods, they have to go to some specific places, register, and continue to go there. Also, they can try to use the internet or video sites. Some of the users stated that the reasons for not starting meditation were that they thought it took a lot of time and effort and that it was challenging to learn and practice. They noted that they did not

start meditation because they were not sure if they could meet these needs. Fourteen participants said that apps make it very easy, offer many features together, and can be easily adapted to daily life. Also, according to the eight participants, the app is constantly near and easy to reach. As stated by participants, a meditation app is a system where they can open anytime, anywhere, and immediately to find solutions quickly if they have a problem. They don't have to go to a professional right away.

Allowing Personalization

Meditation is a personal practice where people's preferences can vary. Eight participants stated that they felt uncomfortable being involved in a particular scenario as a user. During the interviews, all participants emphasized that they made personalization while using many features and that improved their experiences. They stated that an app should not restrict the user, using the application only on predetermined and fixed features does not motivate them. For these reasons, it is among the positive features that apps provide several different options without confusing them and making the application difficult to use.

Being User-Friendly

The participants stated that their aim in entering the app was to reach the target in the shortest time, with the least effort and the easiest way. Eight participants said that they expect an app to be user-friendly and they do not want to have difficulty in using an application that they have entered to relax and reduce stress. That is why it is important to find everything easily without getting confused and having too many steps to pass.

Creating Self Awareness

As a result of field study, it was revealed that users' ability to self-tracking is an important feature in a meditation app that also increases their self-awareness. Some of the features that contribute to self-tracking are that they keep past usage records, show progress, provide data, and even some of the apps send notification about

these data. Twelve participants stated that it was encouraging to record their use and thus to be able to track their history, changes, and progress. Besides, they said, because of that, their self-awareness increased, and this had a positive effect on continuing to use the application.

Being Exciting

Participants said that the elements that excite users and make them wonder are among the factors that motivate them to continue using the app. When the things that excited participants in a meditation app were examined, it was observed that some features were emphasized more. These are setting goals, rewards, challenges, locked sessions, and before-after results.

Keep Active Involvement

During the interviews, participants stated that they started using a health app with enthusiasm and motivation, but they stopped using it soon. It was observed that the maximum duration of using a health app was one to two months. According to twelve participants, apps need to keep their users active with various strategies. When the sections in the application were analyzed, it was seen that these strategies should be applied in setting goals, reward systems, challenges, and meditation in sessions. These participants stated that things need continuity, and a sense of accomplishment keeps them active.

Being Need-Oriented

Meditation is a practice that is expected to offer a solution to a problem. These problems vary from user to user and can be very general or very specific. Although the general topics in meditation apps are stress, anxiety, concentration, and sleep problems, users may wish to use the app for their more specific problems. For example, interviews revealed that participants expected a solution to problems such as a solution to pain, loneliness, unhappiness, and exam stress. The eleven of the participants stated that their main goal was to find the solution they were looking for when they entered the application. To do this, the apps must offer its users many and varied options.

4.7 User-App-Environment

In the diary phase, the second phase of the study, the experience of the users were examined in terms of the time of the day that they meditated, with whom they meditated, how long they meditated, the interaction between the users and the smartphone, and the position of the user while meditating. For this purpose, a total of 45 experience records from 15 participants were analyzed.

The first category is the time of the day that participants meditated. The result from forty-five records in Table 4.5 shows that the number of participants meditated in the morning, at noon, in the afternoon, in the evening, and at night.

Table 4.5. *The time of the day that participants meditated*

in the morning	7
at noon	2
in the afternoon	3
in the evening	21
at night	12

Secondly, between forty-five meditations, some of them practiced alone, some of them practiced with a family member or with a friend, and some of them practiced when some people around (Table 4.6).

Table 4.6. *With whom participants meditated*

when alone	42
with a family member around	1
with a friend around	1
when some people around	1

Thirdly, the duration that shows how long participants meditated in a single session range from less than 5 minutes, 5 minutes, 10 minutes, 15 minutes, and more than 15 minutes. Table 4.7 shows that number of experiences between these ranges.

Table 4.7. *Duration participants meditated*

less than 5 minutes	1
5 minutes	7
10 minutes	18
15 minutes	10
more than 15 minutes	9

Then, according to the diaries, some meditations were performed while the phone was somewhere near the users, and some others were performed while the phone was in the hands of the users (Table 4.8).

Table 4.8. *The interaction between the users and the smartphone*

phone was somewhere near the users	35
phone was in the hands of the users	10

After that, the position of users in meditating changed between sitting, walking and lying. In addition, some participants reported that they were in the position where the app directed them. None of the users reported standing up while meditating (Table 4.9).

Table 4.9. *The position of the user while meditating*

sitting	19
walking	1
lying	12
in the position where the app directed	3

Later, the results of the diaries show that the participants had preferred to close their eyes, look at the screen or look around while meditating. The distribution of these numbers between fourty-five experiences can be seen in the Table 4.10.

Table 4.10. *Participants' visual preferences during meditation*

closed their eyes	28
looked at the screen	7
looked around	5

Finally, some participants said they were wearing their headphones, while others said they had listened to meditation through the phone's speaker. In addition, some participants stated that they turned off the music option while meditating (Table 4.11).

Table 4.11. *Participants' auditory preferences during meditation*

wearing headphones	19
listening from the phone's speaker	23
turned off the music option	3

4.8 Discussion of Field Study Analysis through Positive Psychology

The dimensions of the well-being theory are positive emotion, engagement, positive relationship, meaning, and accomplishment, and dimensions of self-determination theory are autonomy, competence, relatedness, which are two important positive psychology theories. From these two theories, accomplishment and competence focus on similar issues, while positive relationships and relatedness concentrate on the same themes. For this reason, the findings of the study were examined in 6 dimensions, which are the combination of two theories. When the theories and their factors in the literature review chapter and field study results were examined together, some relationships have been observed between them. These factors are positive emotion, engagement, and accomplishment from the well-being theory, and autonomy from self-determination theory (Figure 4.12). However, it was not found a distinct relationship between meditation apps and meaning and positive relationship dimensions. By using this data, designers can identify the factor they want to focus on and then implement the strategies described for them.

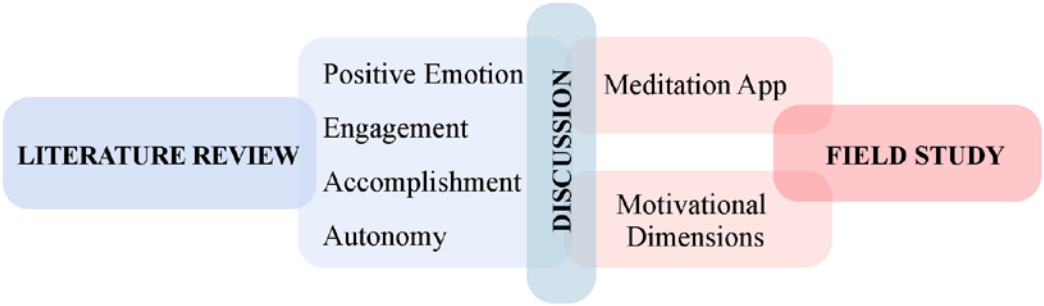

Figure 4.12. Structure of the discussion

Positive Emotion Factors

As a result of some questions asked to the participants after using the meditation application, it was determined that the apps in this category provide some positive emotions with the various features they offered which is one of the well-being theory dimensions. Positive emotions expressed with hope, enjoyment, joy, happiness, feeling good, pleasure, and optimism were added to this section. In the evaluations here various statements from participants such as it made me feel better, it made me happier, it made me happy to know, reaching it or getting something like this made me happy were taken into consideration. In the analysis of the factors contributing to positive emotion, sections of meditation apps and motivation dimensions of users were viewed separately.

When the meditation apps were examined, the elements that produce positive emotion were decided as;

- meditation in sessions and variety of meditation exercise in meditation section,
- different background sounds in sleeping assistant section,
- graphical guidance, motivational messages and random notifications in breath exercise section,
- progress and changes in past use records sections,
- accomplishments feeling in rewards section,
- relaxing sounds section,
- messages in splash screen section and
- nature-based visual themes.

When the motivation dimensions of the individuals were reviewed, it was seen that these intersections were in;

- being user-friendly,
- being credible,
- being effective,

- being exciting,
- being facilitative, and
- allowing personalization dimensions.

Engagement Factors

The question of whether meditation apps can create a sense of engagement in the user has been evaluated on if there are features that can keep users engage, features that can increase their interest and motivation, and features that can keep them at the present moment in the application. After all, some features have been observed to provide this well-being theory dimension.

During the assessment of sections of meditation apps, the engagement factors were determined as;

- variety of meditation types, meditation in sessions, personalization, variety of meditation exercise and information part in meditation section,
- playlist as background sounds and duration option in sleeping assistant section,
- graphical guidance, motivational messages and random notifications in breath exercise section,
- progress and changes in past use records sections,
- number of people meditating, duration people meditate and your friend is meditating information in community section,
- reminder section,
- motivational messages section,
- accomplishment feeling in reward section,
- personal favorites and creating playlist options in relaxing sounds section,
- messages in splash screen section

In addition, the motivation dimensions of the users supporting the engagement are as follows;

- being user-friendly,
- being facilitative,
- being effective,
- being exciting,
- creating self-awareness,
- keep active involvement,
- allowing personalization

Accomplishment Factors

During the analysis, it was observed that there are some features that create a sense of accomplishment feel to the user which is one of the well-being theory dimensions. While making these analyzes, it was focused on having various goals and the feeling of ambitions that caused by these goals. As a result, the features that create these feelings were determined.

The factors of accomplishment in the app were observed as;

- task part in splash screen section,
- rewards, mood and feeling assessment in questionnaire sections,
- progress and changes in past use record section,
- challenges, level of meditations and meditation in sessions in meditation sections.

The factors of accomplishment in motivation dimensions determined as;

- being exciting,
- creating self-awareness and
- keep active involvement.

Autonomy Factors

When the theories in positive psychology and findings are evaluated together, it has been observed that the autonomy dimension is important in meditation apps, which

is one of the self-determination theory dimensions. Users stated that they had some expectations, such as having control over something, having the feeling of choice, and having the right to choose between various options. When looking at whether there are features that offer them in meditation apps, it is seen that some features are at the forefront.

After the analysis, autonomy factors in meditation apps were decided as;

- personalization in meditation sections,
- playlist as background sounds and duration options in sleeping assistant sections,
- pre-set option in reminder section,
- personal favorites and creating playlist options in relaxing sounds sections.

Besides, autonomy factors in motivational dimensions were observed as;

- being exciting,
- keep active involvement and
- allowing personalization.

Positive Relationship Factors

Considering whether meditation apps can contribute to positive relationship dimension from the well-being theory, it has been observed that there are some community features that socialize individuals. However, all 15 participants stated that they did not expect from a meditation app to meet such a need because meditation is a very individual activity.

Meaning Factors

Meaning is another dimension of well-being theory. Meditation activity on its own contributes to the pursuit of meaning in life for individuals, but when the participants' responses were analyzed, it has appeared that there are no any particular parts or feature in a meditation app that explicitly provides this.

CHAPTER 5

CONCLUSION

The aim of this study is to provide recommendations on how to design and develop mental m-health technologies that aim to provide better mental health and well-being for the individuals through the investigation of current meditation apps.

In accordance with this purpose, first, a literature study on positive psychology, meditation, and positive approaches in technology design was carried out in order to understand the necessary theories and technologies and also fundamentals of the meditation apps (see Chapter 2).

Secondly, a field study consisting of semi-structured interviews, and online diaries was conducted to understand the meditation experiences of the users and to analyze m-health meditation technologies through existing apps (see Chapter 3).

Finally, the results of the field study were analyzed, comprehensive findings of the study were demonstrated, and important points that intersect the literature review were identified. (see Chapter 4).

This chapter, firstly, includes the presentation of the research questions answered by examining the literature review and field research findings. After that, the limitations of the study and opportunities for further research were addressed, and finally contributions of the study were mentioned.

5.1 Revisiting the Research Questions

The main research question and supportive sub-questions are as follows;

- *What are the design strategies to be adopted in the design of m-health apps that focus on meditation?*

- What are the strengths and weaknesses of current meditation apps?
- What are the characteristics of the meditation experience that are practiced through mobile technologies?
- Which characteristics of the meditation apps help to enhance positive experiences?
- What are the principles of positive psychology that can be applied in the design of meditation apps?

Q1: What are the strengths and weaknesses of current meditation apps?

The first sub-question focuses on the identified strengths and weaknesses of the current meditation apps. These findings were evaluated based on the features offered by three selected applications. It does not contain a comprehensive analysis of the existing apps. In this way, while improving or redesigning meditation apps, these pre-identified features can be used to strengthen the weaknesses or support the strengths.

According to the data collected from the participants after one week of app use, the strengths and weaknesses of the selected meditation apps had emerged. Some of these features were common to all three apps, while others were specific to the only one application.

Firstly, when looking at the weaknesses of the apps, the most emphasized feature was the inadequacy of the needs-oriented meditations. Participants stressed that the reasons for using meditation application can vary from a very general to a more specific need. For example, anxiety, motivation, focus, or sleep problems are more general reasons, while coping with the physical pain, relaxation before the exam or job interview, or curing social anxiety are more specific reasons to use the app. However, although meditations for general needs were sufficient, there was not enough meditation on more specific issues in the applications. In the design of

these applications, the needs of the users should be analyzed carefully, and a sufficient variety of meditation should be added to the application.

Another weakness of the current meditation apps was lack of different levels of meditation. Meditation apps can be used by people who are very experienced in meditation and also people who have never experienced meditation before. However, there was not any user profile distinction in terms of their experience level that has been made in any of the apps. During the field study, more experienced users emphasized the lack of more technical meditations such as Zen Meditation (Zazen), Vipassana Meditation, Transcendental Meditation (TM). These types of meditations require prior knowledge and experience and contain more technical information, and also they can be difficult practices for individuals at the beginner level. Furthermore, inexperienced users noted the lack of more beginner level meditations. These are, for example, guided meditations that explain everything step by step and give the user detailed and clear instructions. In the design of these applications, there should be meditations according to the users of different levels, and the level of meditation should be specified by the application. For example, the application can give numbers for meditations according to their hardness level in a way that the user can see and select.

As shown in Chapter 4, all the participants want to see that meditation app is effective, and it creates self-awareness. One of the most common ways to achieve these is to provide users with their before-after changes, long-term usage data, achievements, and completions. However, participants stated that this information was not presented to them understandably, there were various deficiencies in information about themselves, and they could not follow the changes clearly. The design has an important role in the presentation of this data, process, and before-after results in a clear way as desired by the users.

Another feature where participants feel the lack in the app was the part where the application advises specific meditation for the user. Participants said that they

expect applications to offer more exclusive and personal use. They also emphasized that they felt the lack of a part in the application which can analyze their current situation and propose a solution according to it. It should be given importance to add such a questionnaire part to the design of the applications to suggest a suitable meditation as a result.

Finally, participants complained in general about the lack of exciting and motivating elements in the apps. They stated that there were insufficient elements to motivate them, and they need more exciting and motivating things to continue using the application. The first thing that excites and motivates the users is to reach past usage records. Users get excited to see their progress and before-after changes. It can be considered in the meditation app design that a section where they can access this information whenever they want and also sending this information to them as a notification can be another way. Besides, the addition of setting goals, rewards, challenges, locked sessions parts in the meditation app were determined as other factors that motivated them.

The experience of meditation is a very personal process. When the data obtained from the participants were analyzed, all these personal expectations and differences in preferences were presented in Chapter 4. According to these data, one of the strengths of these meditation apps was that they allow users to make personalization and various choices. In some of these apps, these preferences were more limited, while in others, more personalization was allowed. When designing applications, it should be kept in mind that users should be given options to make personalization. The expectations of the users from the personalization option were explained in Chapter 4.

One of the reasons why meditation is performed on a mobile device is that the user can quickly find a solution to a problem. The quick meditation part of the applications, which is designed specifically for these situations, was also mentioned among the powerful features of the applications. These sections aim to quickly find solutions to the user and they do not require a lot of settings and time.

While designing the applications, it is necessary to make such a distinction and add a quick meditation option for users who do not have time.

Another feature that is common to selected applications and evaluated as a powerful feature by participants was that these applications not only include meditation section but also breathing exercise and sleeping assistant. Thus, the apps became more comprehensive, and users do not need to use another app for other exercises. Adding the same concept but different exercises to the designs of meditation apps positively affects the users.

The visuals, interfaces, and themes of the applications received positive feedback from the participants in general and emphasized as powerful features. The applications that were using nature photographs such as sea, sky or forest and have soft colors have been described as relaxing by the participants. Participants also stated that the use of visuals with these features made them forget that they meditate on an electronic device. Therefore, it is important to use visuals and colors with these properties in the design of these applications.

The other strength of these applications mentioned by all participants, in general, was that they were easy to use. Participants stressed that they do not expect to experience difficulties in an app they use to relax. In order to facilitate the use of meditation apps, clear categorization should be created, understandable titles and recognizable icons should be used, only necessary setting options should be provided, useful color guidance should be offered, search options should be added to find what they are looking for in the app.

This information can be used in the design of future meditation applications or research about meditation applications to eliminate the weaknesses of these applications or to support their strengths with various innovations.

Q2: What are the characteristics of the meditation experience that are practiced through mobile technologies?

The second sub-question focuses on the experience part of the meditation practice that is carried out by using a mobile application. The preferences of the users to the meditation experience were determined. Based on these features, better meditation experiences can be provided to users.

The characteristics of the meditation experience that is practiced by using mobile phones were determined from the data obtained mostly from the diary phase of the study. A comprehensive description of this data was provided in Chapter 4, sections 4.4 and 4.7.

This part consists of the preferences and expectations of the users in the meditation experience through a mobile app. The results obtained in this section provide researchers and designers with various insights about the users' meditation experience that is applied through a mobile phone. These insights can be used in comparison with traditional or group meditations.

These were examined under seven titles. These are the time of the day that participants meditated, with whom participants meditated, duration participants meditated, the interaction between the participants and the smartphone, the position of the participants while meditating, participants' visual preferences during meditation, and participants' auditory preferences during meditation.

According to this data, the ideal experience can be described as follows. Participants often prefer to meditate in the evening, after work because while they are at work during the day, they do not prefer meditation to relax them too much. Instead, they prefer to use it to relieve the tiredness of the day after work or school. They often meditate alone and for 10 minutes. While they found the shorter time ineffective, they said they were distracted for longer periods. The most preferred position when meditating was also determined as a part of this experience. During

the experience, participants usually prefer to sit down, close their eyes, and leave the phone somewhere near and listen to the meditation from the phone's speaker. Other options related to these experiences and the ratio of participants' preference for these alternatives were described in detail in Chapter 4.

When comparing other meditation experiences with meditation app experience, the following results have been obtained; it is always easier to access the application, and it is always ready to use, whenever people want, and whenever they feel ready to use it. It is difficult to find the right and safe sources in other options and to choose among them. In the application, many content and different exercises are offered together, and it saves a lot of user data such as their changes, past usages, progress, and accomplishments. It also allows individuals to customize their visuals and music and provide lots of personalization options.

In addition, the environmental preferences of the participants were added to this section. According to this, it was revealed that the participants preferred to meditate in a dim or dark environment that was also quiet, calm, free from external stimuli, and not crowded. The changes that they usually made before the meditation were adjusting the light and cleaning the surroundings.

This ideal meditation experience preferences and environment, which are determined by the users' experiences, can be used to guide the users in order to offer them a better experience in the design of the applications.

Q3: What are the elements of positive psychology that can be applied in the design of meditation apps?

Another strategy may be to focus on meeting the psychological need in the design of m-health apps. For this purpose, psychological needs that a meditation app should fulfill in order to enhance users' well-being and flourishing have been identified.

This study examines positive psychology through two macro theories. The first one is the Well-Being Theory, and the second one is the Self-Determination Theory. Positive psychology includes studies on well-being and human flourishing. Well-Being Theory and Self-Determination Theory explain different methods to achieve this goal. According to the Well-Being Theory, five needs to be fulfilled to achieve this goal are positive emotion, engagement, relationship, meaning, and achievement and according to the Self-Determination Theory, there are three basic needs to be fulfilled which are autonomy, competence, and relatedness. All these theories were explained in detail in the literature chapter (Chapter 2).

In another section of the literature study (Chapter 2), various approaches that are grounded on these theories were examined. These are positive computing, positive technology, positive design, and positive experiences. These approaches created various data by interpreting these theories within their own fields. The approaches were chosen for this study because they focus on design, technology, and experience, and are able to provide information on the design and user experience of mobile health applications. For these reasons, it was thought that they could be supportive and informative for the later parts of the study.

The results of the field study were analyzed by considering these needs that were determined by the well-being theory and the self-determination theory. Furthermore, different use of these needs through positive computing, positive technology, positive design, and positive experience was taken into consideration. As a result, it was observed that positive emotion, engagement, accomplishment, and autonomy needs were emphasized many times during the field study. Therefore, these were determined as users' needs that they are required to be fulfilled when using a meditation app. By meeting these needs, the well-being of the users and, consequently, the flourishing can be increased.

Having positive emotion is one of the elements that enhance psychological well-being. During the literature study, it was often mentioned that positive emotion is

related to happiness, joy, pleasure, and enjoyment. One of the expectations of the users is that the meditation app creates positive emotions. These apps can increase positive emotions with various features. For example, by providing lots of different types of meditation exercises and a variety of relaxing background sounds, sending motivational messages, presenting their personal progress and changes, promoting accomplishments feeling, having nature-based visual themes.

Engagement is another element that increases psychological well-being. This element is often associated with an individual's being in the present moment and being in the flow. The features that provide this in the meditation application are the ability to personalize, reach different types of meditations, listen to personal favorites and create a playlist in the background, receive motivational messages, get information about the community, get reminders, and receive awards.

Accomplishment is the third element that people hope to have in meditation apps. Being able to achieve things can give people a sense of accomplishment, and having accomplishments help people to have better psychological well-being. In meditation application, the features that provide users with a sense of accomplishment are having various tasks and challenges, getting rewards, mood and feeling assessment, and seeing progress and changes.

Autonomy has been identified as the last element that users expect to find in meditation app, which also positively affects psychological well-being. Having autonomy allows individuals to make decisions and make choices. People feel like they have autonomy while using meditation apps thanks to personalization options, being able to add personal favorites and create a playlist as relaxing background sounds.

The features to focus on when designing a meditation app to meet these psychological needs were mentioned above. In order to fulfill these needs separately, the factors that should be focused on in a meditation app were explained in detail in Chapter 4, section 4.8.

Q4: Which characteristics of the meditation apps help to enhance positive experiences?

It can be focused on motivational elements to enhance the user's positive experience. By focusing on these motivational elements, a meditation app can be designed. What a meditation app should offer to increase the motivation of the user were examined under the fourth sub-question.

During the field study, various features of meditation apps that create positive experiences were specified by analyzing the relationship between the user and the app. The values that made the participants' experiences positive also emerged as features determining their motivation in using the meditation application. These dimensions were decided as being facilitative, being effective, and being user-friendly, being exciting, creating self-awareness, keeping active involvement, being need-oriented, and allowing personalization.

The first dimension is being facilitative. When the data obtained from the participants were analyzed, it was found that they thought meditation is a difficult practice, it requires a lot of time and effort, and it is challenging to learn. For the traditional methods, they have to go to some specific places, register, and continue to go there. However, the app makes it very easy. Users can use the app anytime, anywhere, and find solutions quickly if they have a problem. Furthermore, other factors that make app facilitative are it can be easily adapted to daily life and it offers many functions together, and. For example, users are provided with a narrator, the background sound, the ability to choose the duration and reason for meditation, past usage records, and feedback. To find all of these together apart from the app, users need to find, select, and adjust many things.

Being effective is another motivational dimension. Users anticipate finding solutions and feeling better mentally or physically after using a health app. As a health-related app, meditation apps aim to reduce stress and anxiety, help sleep problems, make users relax, and increase their concentration. If users see any

results or changes, their motivation increases, and they continue to use the app. Applications can be useful by carefully selecting the content they offer, by getting help from healthcare professionals if necessary, and by effectively presenting their results to users.

The other positive experience dimension is being user-friendly. When participants talk about their experiences in the meditation app, they stated that the whole experience should have a relaxing effect. This experience does not only cover the part after they start listening to the meditation, but it also includes the experience from the interaction with the phone until they choose a meditation. One of the most critical factors that make this experience relaxing is that the application is being user-friendly. Thus, the user's experience continues to be positive throughout the whole process. Factors that make meditation app user-friendly were decided as understandable categorization, clear headings, recognizable icons, less setting options, useful color guidance, search options to find what is looking for and reach the target in the shortest time, with the least effort and the easiest way.

Participants also stated that being-exciting is a positive experience dimension and motivates them to continue using the application. They said that although they were expecting a relaxing experience from the app, they would be negatively affected by the application being boring. The elements that make these meditation apps exciting were setting goals, getting rewards, having various challenges and locked sessions, and seeing before-after results.

Creating self-awareness is another emerging dimension. In this dimension, users expect to find useful information about themselves or information that they can adapt to their life. Therefore, they mentioned that they want to realize something they have not previously noticed. The important features that allow to self-tracking are that it keeps past usage records, shows progress, provides data, and also sends a notification about these data. While this dimension is close to being effective dimension in terms of seeing some results, it is also related to being exciting dimension as a result of the excitement of learning one's own information.

The other dimension that provides users with positive experiences is to keep active involvement. During the day, individuals dealing with a lot of things and work-related issues, which make them postpone or forget to use an application regularly. In these cases, users generally say that I did not have the opportunity, I did not find enough time, or I forgot to use the app. For this, users expect the application to be able to involve them without disturbing. Some of the features that help to keep users involved are setting goals, reward systems, challenges, notifications, reminder and meditation in the form of sessions. The features that require continuity and sense of accomplishment keep them active.

During the study, it was seen that being need-oriented is another crucial dimension. In this dimension, the users expect that the application is being more specific to them rather than the general one that offers the same things for everyone. If participants can find the particular solution that they were looking for, that also makes application useful and exciting. To be able to provide this, the apps must offer its users many and varied meditation options such as stress, anxiety, concentration, and sleep problems, and also the solution to pain, loneliness, unhappiness, exam stress, social problems, public speaking stress and relax your muscles.

The last dimension is allowing personalization. According to findings, users do not want things to be presented to them in a predetermined way by the app. They want to be involved in the process, being able to decide and select the things. They said that in this way they feel that what was offered to them is special to them. For these reasons, the participants want to choose the theme of the application, duration of the meditation, voice of the narrator, background sound, time of the reminder, frequency of the notifications.

Further, these dimensions were described in more detail in Chapter 4. While working on meditation applications, designers and researchers can consider these dimensions.

Main Question:

What are the design recommendations to be adopted in the design of m-health apps that focus on meditation?

As a result of analyzing the data and evaluating the results, different recommendations that can be used in the design of meditation based m-health applications were determined (Table 5.1). In addition, positive psychology elements that can be applied in these designs have been identified (Table 5.2).

Designers, researchers, developers, and all other actors working in the field of psychology, meditation, HCI, design, technology, and UX or where these fields are used together can benefit from these strategies as an insight source.

Table 5.1. *Design recommendations to be adopted in the design of meditation apps*

do's	don'ts
• Consider user's meditation experience level • Add meditations for general to specific needs • Provide meditations in the form of sessions • Support self-tracking with personal results, progress, and changes with before-after information, long-term usage data, achievements, and completions • Ask people's moods/feels and advice suitable meditation or other exercises • Provide quick meditation option • Support meditation exercises with breathing exercise and sleeping assistant • Guide Breathing Exercises with motion graphics and sound • Provide usage path as a guide • Update content regularly • Motivate people after the exercise as "You are a star! You completed first session! • Design a Splash screen for motivational beginning • Give Feedback • Show core features at the Main page • Keep user engage with nature photographs • Excite user with past usage records, progress, before-after changes, notification, setting goals, rewards, challenges, locked sessions, and various tasks • Allow them to make personalization by providing various choices • Make it easy to use with recognizable icons, clear categorization, understandable titles, only necessary setting options, useful color guidance, and search option • Provide variety of relaxing background sounds, enable them to listen personal favorites and create a playlist • Offer motivational messages • Show the research behind app	• Send reminder to show meditation time; because users prefer to decide that time • Add overwhelming choices; because users think this is confusing and time-wasting • Gamify the app too much; because users do not want to compete in the app to not losing the relaxing effect • Send too many notifications; because users think it's annoying • Create clutter with too many contents • Give too many information • Use only icons; because users think this is hard to understand and difficult to use • Put everything under the main category; because users think sub-categories make it easy to use • Add community/socialization section; because users don't want to socialize and they want to be alone • Standardize exercises; because users think it will be boring after a while • Expect them to write; because users find it easier to choose from certain options • Give badge as rewards; because users don't think it's motivating • Allow content run out; because this causes users to stop using the application • Combine other health related feature like drink water or exercise • Add too many meditation related exercise; because users think it complicates the app

Table 5.2. *The elements of positive psychology that can be applied in the design of meditation apps*

Positive Psychology Elements to Apply Design of Meditation Apps	
to increase **Positive Emotion** focus on	to increase **Engagement** focus on
• meditation in sessions and variety of meditation exercise in meditation section • different background sounds in sleeping assistant section • graphical guidance, motivational messages and random notifications in breath exercise section • progress and changes in past use records sections • accomplishments feeling in rewards section • relaxing sounds section • messages in splash screen section • nature-based visual themes.	• variety of meditation types, meditation in sessions, personalization, variety of meditation exercise and information part in meditation section • playlist as background sounds and duration option in sleeping assistant section, • graphical guidance, motivational messages and random notifications in breath exercise section • progress and changes in past use sections • number of people meditating, duration people meditate and your friend is meditating information in community section • reminder section, • motivational messages section • accomplishment feeling in reward section • personal favorites and creating playlist options in relaxing sounds section • messages in splash screen section
to increase **Accomplishment** focus on	to increase **Autonomy** focus on
• task part in splash screen section • rewards, mood and feeling assessment in questionnaire sections • progress and changes in past use record section • challenges, level of meditations and meditation in sessions in meditation sections	• personalization in meditation sections • playlist as background sounds and duration options in sleeping assistant sections • pre-set option in reminder section • personal favorites and creating playlist options in relaxing sounds sections

5.2 Limitations and Suggestions for Further Studies

Several different limitations were encountered at various stages of the study. These were explained in detail below.

Meditation is a process in which the individual's experience is extremely valuable. Therefore, it was crucial to record the experiences as soon as possible to avoid losing data during the study. For these records, the user was expected to complete the diary that sent online after using the meditation app. It was one of the most challenging parts of the field study to have all users do this regularly. It should be taken into consideration that these diaries should be followed up regularly, and if participants do not fill, they should be reminded to fill them.

In order to obtain successful data, users had to use the meditation app several times. However, meditation is not an exercise that can be practiced at any time, and a participant has to need to or want to meditate. For these reasons, expecting users to do enough meditations was another challenge.

Meditation apps, especially the meditation apps used in this study, were very comprehensive and offered many features besides meditation. It was not possible for all users to use all these features. Therefore, this should be taken into consideration when selecting applications for similar studies.

The language of the participants was Turkish, and that was a limiting factor in the selection of the applications. The number of applications that can be selected was decreased accordingly. Therefore, when selecting users, the language of the applications and participants should be taken into consideration.

During the study, various updates came to the selected applications. Because of that, some features changed, and numerous new features were added to the applications. Besides, an application changed its name after the study and renewed

most of its content. It should be taken into consideration that these can be experienced during field research.

During the study, it was seen that different meditation experience levels might cause differences in the evaluation of the apps. In future studies, in order to obtain more specific results, a distinction can be made when determining the user profile, such as those are experienced in meditation and those are not experienced. Thus, the differences in the expectations of two different groups can be determined.

As a result of this research, applications were evaluated in many different fields, and various insights were introduced. For more in-depth data, a study focusing on only one of these issues can be conducted. This study has a limited number of participants. More powerful results can be achieved by performing with a larger number of participants. In addition, the study was carried out through three applications. Performing with more apps can contribute to the analysis of more diverse features in meditation apps.

5.3 Contribution of the Study

This research explores meditation-based m-health technologies in three contexts through a holistic analysis of before, during, and after use. These are the user, the app, the environment, and their interrelationships. As a result of these studies, the contributions of the study were determined as follows.

Firstly, the study contributes to the literature with knowledge by adopting a multidisciplinary approach consisting of many different disciplines such as psychology, meditation, design, technology, UX, and HCI. Studying the literature of these disciplines together allows researchers from many different areas to benefit from this thesis for their own discipline.

Secondly, the study provides insights about meditation-based mobile applications in terms of their strengths and weakness, motivational factors that support positive

experiences, and their relationships with positive psychology and its elements. Thus, when designers and developers design a meditation app, they can strengthen the foundation of their designs by benefiting from this thesis, which is supported by various theories and studies. Besides, they make their designs more valuable and powerful because they use a theory-based approach.

Finally, the study characterizes a technology-based meditation experience. It explains the experience by focusing on users' adaptation of the app into the daily life and reveals the preferences, thoughts, and expectations of the users about the meditation app and usage context in detail. Since technology becomes increasingly important in all areas of life, it provides various information in terms of discovering the differences, advantages, or disadvantages resulting from the practice of traditional exercises through using technology.

Designers, researchers, and practitioners can benefit from this thesis as a source of literature knowledge and insights for related studies. This study can be seen as a resource due to the lack of studies that bring all these fields together and provide data in such a broad context.

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APPENDICES

A. Araştırmaya Gönüllü Katılım Formu (Turkish)

Bu araştırma, ODTÜ Endüstri ürünleri Tasarımı Bölümü Yüksek Lisans öğrencisi Yağmur Merve ARIK tarafından Prof. Dr. Gülay Hasdoğan danışmanlığındaki yüksek lisans tezi kapsamında yürütülmektedir. Bu form sizi araştırma koşulları hakkında bilgilendirmek için hazırlanmıştır. Bu çalışmanın amacı, mevcut meditasyon uygulamalarının araştırılması yoluyla, bireyler için daha iyi bir ruh sağlığı ve refahı sağlamayı amaçlayan zihinsel sağlık teknolojilerinin tasarlanması ve geliştirilmesi sırasında faydalanılabilecek önerilerin oluşturulmasıdır.

Bu çalışma üç temel aşamadan oluşmaktadır. İlk aşama yaklaşık yarım saat sürecek olan ve size sorulan soruları cevaplamanız beklenen mülakat aşamasıdır. İkinci aşamada sizden beklenilen seçtiğiniz uygulamayı bir hafta boyunca kullanmanız ve bu süreçte size gönderilecek olan ve tamamlanması yaklaşık 5 dakika sürecek dijital günlükleri doldurmanızdır. Son aşama tekrar yaklaşık yarım saat sürmesi planlanan ve bir haftalık kullanım tecrübelerinize göre mülakat sorularını cevaplamanız beklenen aşamadır. Mülakatlar sırasında ses kaydı alınacaktır.

Araştırmaya katılımınız tamamen gönüllülük temelinde olmalıdır. Sizden çalıştığınız kurum/bölüm/birim belirleyici hiçbir bilgi istenmemektedir. Kimliğiniz ve cevaplarınız tamamıyla gizli tutulacak, sadece araştırmacılar tarafından birbirinden bağımsız olarak değerlendirilecektir. Katılımcılardan elde edilecek bilgiler toplu halde değerlendirilecek ve akademik amaçlarla kullanılacaktır.

Çalışma sırasında sorulardan ya da herhangi başka bir nedenden ötürü kendinizi rahatsız hissederseniz istediğiniz zaman çalışmadan ayrılabilirsiniz.

Bu çalışmaya katıldığınız için şimdiden teşekkür ederiz. Çalışma hakkında daha fazla bilgi almak için çalışmanın yürütücüsü yüksek lisans öğrencisi Yağmur

Merve Arık (E-posta: yagmur9213@gmail.com) ya da proje danışmanı Prof. Dr. Gülay Hasdoğan (E-posta: hasdogan@metu.edu.tr) ile iletişim kurabilirsiniz.

Yukarıdaki bilgileri okudum ve bu çalışmaya tamamen gönüllü olarak katılıyorum.

(Formu doldurup imzaladıktan sonra uygulayıcıya geri veriniz).

İsim Soyad Tarih İmza

Informed Consent Form (English)

This research is carried out by METU Industrial Design graduate student Yağmur Merve ARIK under the supervision of Prof. Dr. Gülay Hasdoğan within the scope of a master's thesis. This form has been prepared to inform participants about the research. The aim of this study is to propose suggestions that can be used during the design and development of mental health technologies aiming to provide better mental health and well-being for individuals through research of current meditation apps.

This study consists of three-phase. The first phase is the semi-structured interview phase, which will take about half an hour, and you are expected to answer various questions. In the second stage, you are expected to use a meditation application that you chose before for a week and fill the online diaries that will be sent to you. This process is expected to take about 5 minutes to complete. The last phase is the stage that is planned to take about half an hour again, and you are expected to answer the various semi-structured interview questions according to your experience after the one week. Voices will be recorded during the interviews.

Your participation in the research should be voluntary. There will not be any information that is requested about your institution/department/unit. Your identity and answers will be kept entirely confidential, and will only be evaluated independently by researchers. The information to be obtained from the participants will be evaluated collectively and used for only academic purposes.

If you feel uncomfortable due to questions or any other reason during the study, you can quit the study at any time.

Thank you for participating in this study. To get more information about the study, you can contact with graduate student Yağmur Merve Arık (e-mail: yagmur9213@gmail.com) or project supervisor Prof. Dr. Gülay Hasdoğan (e-mail: hasdogan@metu.edu.tr).

I have read the information above and fully volunteer to participate in this study.

(After completing and signing the form, return it to the practitioner).

Name/Surname Date Signature

B. Aşama 1; Yarı Yapılandırılmış Görüşme Soruları (Türkçe)

Katılımcı Bilgileri

Ad Soyad:

Telefon:

E-Mail:

Yaş:

Eğitim seviyesi:

Lise ☐ Lisans ☐ Yüksek Lisans ☐ Doktora derecesi ☐

Meslek:

Cep telefonu işletim sistemi:

İOS ☐ Android ☐

Aşama 1 Soruları;

- Günlük yaşamınızda sıklıkla stres, endişe, uyku veya konsantrasyon sorunu yaşar mısınız?

- Bu problemlerle nasıl baş ediyorsunuz?

- Daha önce meditasyon yapmayı denediniz mi? Eğer evet ise hangi meditasyon türü?

- Meditasyondan beklentiniz nedir? Neden insanların meditasyon yaptığını düşünüyorsunuz?

- Daha önce hiç mobil sağlık uygulaması kullandınız mı? Evet / Hayır

    - Hangi sebepten/problemden dolayı?

    - Bu uygulamaları ne kadar süre kullandınız?

    - Bu uygulamaları kullanmaya / indirmeye nasıl karar verdiniz?

- Sizce insanlar neden sağlık sorunları için bir uygulamayı kullanmayı tercih ediyor?

- Kullandığınız sağlık uygulamalarında hangi özellikleri görmek istersiniz?

- Bir uygulamayı kullanmaya devam etmek için sizi motive eden nedir?

- Ücretli bir uygulamayı indirmeye nasıl karar verirsiniz?

-Uygulamalar tarafından gönderilen hatırlatıcılar veya motive edici mesajlar hakkında ne düşünüyorsunuz?

Katılımcılar bir uygulama seçecekler;

- Hangi uygulamayı seçmek istersiniz?

- Bu uygulamayı neden seçtiniz?

- Bu uygulamadan ne bekliyorsunuz? Ne bilmek/öğrenmek istiyorsunuz?

Phase 1; Semi-Structured Interview Questions (English)

Participant Information

Name Surname: ……

Phone: …….

E-Mail: …….

Age: ……..……

Highest degree/level of education completed:

High School ☐ Bachelor's degree ☐ Master's degree ☐ Doctoral degree ☐

Occupation: ……..…….

Mobile Phone Operating System:

iOS ☐ Android ☐

Phase 1 Questions;

- Do you experience stress, anxiety, sleeping or concentration problem in your daily life?

- How do you deal with these problems?

- Have you tried meditation before? If yes which type of meditation?

- What is your expectation from meditation? Why do you think people meditate?

- Have you used any m-health apps before? Yes / No

    - For what reason/problem?

    - How long did you use these apps?

    - How did you decide to use/download it?

- Why do you think people prefer to use an app for health problems or tracking?

- What features would you like to see in your health app?

- What motivates you to continue using the app?

- How do you decide to download a paid app?

- What do you think about reminders or motivating messages sent by these applications?

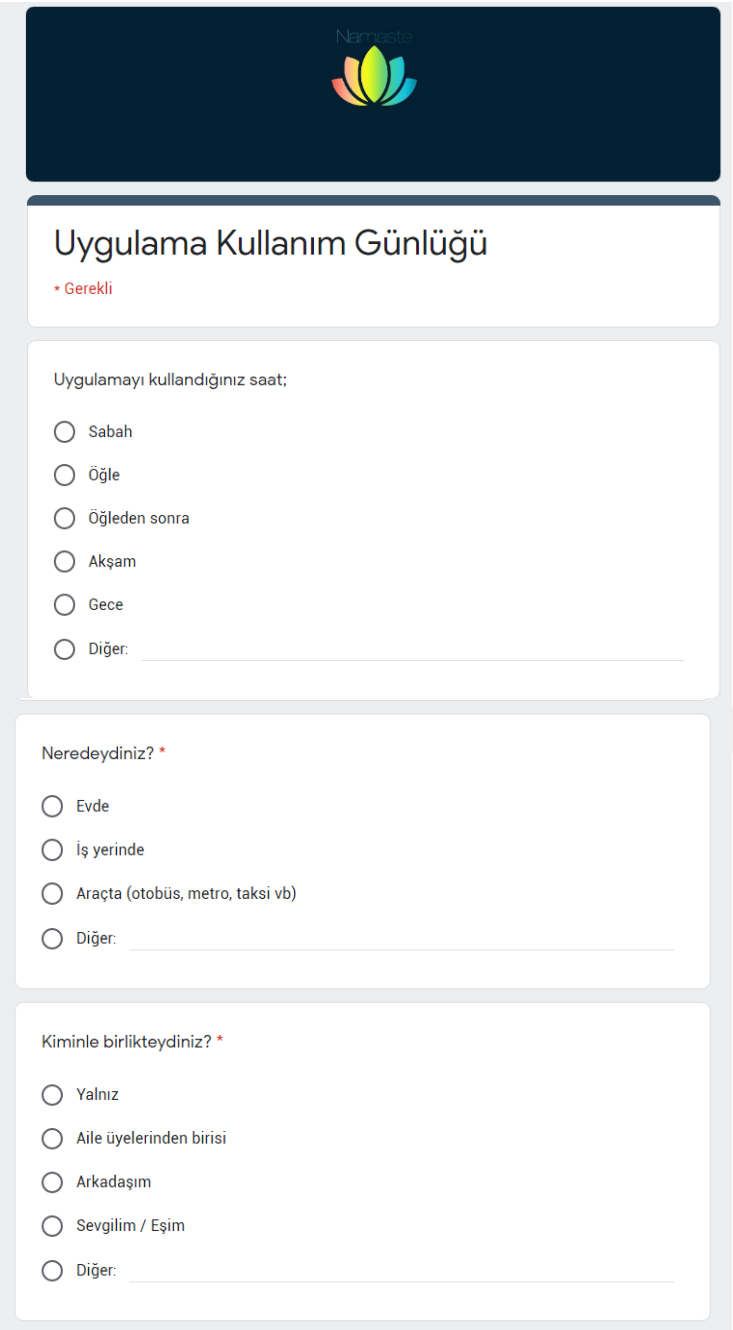
Participants will choose an app;

- Which application would you choose?

- Why did you select this application?

- Which types of features would you expect from this application?

C. Aşama 2; Günlük Soruları (Türkçe)



Uygulamayı kullanmayı size ne hatırlattı? *

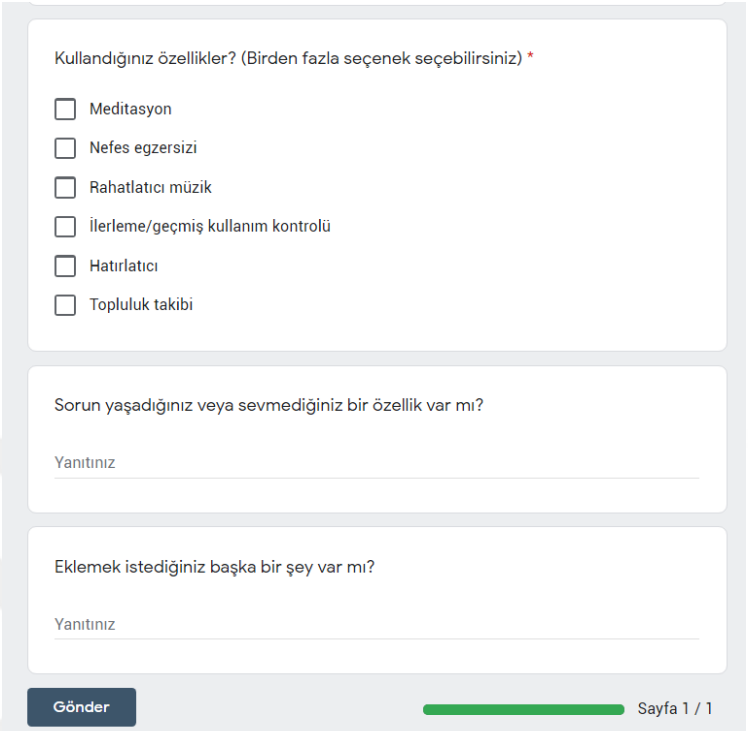
- ◯ Uygulamanın hatırlatıcısı
- ◯ Bir tanıdığım
- ◯ Yaşadığım problem
- ◯ Diğer: _____

Ne kadar zaman harcadınız? *

- ◯ 5 dakikadan az
- ◯ 5 dakika
- ◯ 10 dakika
- ◯ 15 dakika
- ◯ 15 dakikadan fazla

Uygulamayı kullanırken...(Birden fazla seçenek seçebilirsiniz) *

- ☐ Oturuyordum
- ☐ Ayaktaydım
- ☐ Yürüyordum
- ☐ Uzanıyordum
- ☐ Uygulamanın beni yönlendirdiği pozisyondaydım.
- ☐ Telefon elimdeydi.
- ☐ Telefon yakınımda bir yerdeydi.
- ☐ Kulaklık takıyordum.
- ☐ Telefonun hoparlöründen dinliyordum.
- ☐ Ses/müzik opsiyonu kapalıydı.
- ☐ Gözlerim kapalıydı
- ☐ Ekrana bakıyordum.
- ☐ Etrafıma bakıyordum.


Kullandığınız özellikler? (Birden fazla seçenek seçebilirsiniz) *
Meditasyon
Nefes egzersizi
Rahatlatıcı müzik
İlerleme/geçmiş kullanım kontrolü
Hatırlatıcı
Topluluk takibi
Sorun yaşadığınız veya sevmediğiniz bir özellik var mı?
Yanıtınız
Eklemek istediğiniz başka bir şey var mı?
Yanıtınız
Gönder
Sayfa 1 / 1

Phase 2; Diary Questions (English)

The time of the day that you meditated

In the morning

At noon

In the afternoon

In the evening

At night

Other

Where were you?

At home

At the workplace

In the vehicle (bus, metro, taxi etc.)

Other

With whom you meditated

Alone,

With a family member

With a friend,

When some other people around

Other

What reminded you to use the app?

App reminder

Someone

A problem I'm having

Other

Duration you meditated in a single session

Less than 5 minutes,

5 minutes,

10 minutes,

15 minutes

More than 15 minutes

Other

While using the application… (You can choose more than one option)

Sitting,

Standing up

Walking

Lying.

In the position where the app directed me

Phone was somewhere near

Phone was in my hands

I was wearing headphones,

I listened to meditation through the phone's speaker.

I turned off the music option

Closed my eyes,

Looked at the screen

Looked at the around

The features you used? (You can choose more than one option) (These options vary for each mobile application.)

Meditation

Breathing exercise

Sleep Assistant

Relaxing music

Progress / past usage

Reminders

Community

Is there a feature that you have trouble or don't like?

Answer

Is there anything else you would like to add?

Answer

D. Aşama 3; Yarı Yapılandırılmış Görüşme Soruları (Türkçe)

- Genel uygulama kullanımınız nasıldı?
- Uygulama beklentilerinizi / ihtiyaçlarınızı karşıladı mı? Neden?
- Bu uygulamanın size yardımcı olduğunu düşünüyor musunuz? Nasıl?
- Uygulamayı hangi durumlarda kullanmak istersiniz? Neden?
- Uygulamayı kullanırken bulunduğunuz ortam nasıldı? Bu faktörler sizi nasıl etkiledi? (Ses, ışık, kalabalık vb.)
- Uygulamanın kullanmadığınız herhangi bir bölümü/özelliği var mı? Neden?
- Görseller ve talimatlar anlaşılır mıydı?
- Uygulama içeriğinin, görsel bilgilerin ve tasarımın uygulamanın amacına uygun olduğunu düşünüyor musunuz?
-Uygulama tarafından gönderilen mesajlar, hatırlatmalar, geribildirimler hakkında ne düşünüyorsunuz?
- Uygulamadaki görevler, seviyeler veya ödüller hakkında ne düşünüyorsunuz?
- Uygulama içindeki bilgileri yeterli buldunuz mu?
- Uygulamayı kullanmak heyecan verici veya motive edici miydi? Neden?
- Uygulamayı öğrenmek / kullanmak kolay mıydı?
- Bu uygulamanın yenilikçi ve yaratıcı olduğunu düşünüyor musunuz?
- Geleneksel meditasyon ile bu uygulamayı kıyaslarsanız neler söylersiniz?
- Topluluk özelliği hakkında ne düşünüyorsunuz?
- Uygulamaya teknoloji ya da servis entegrasyonu hakkında neler düşünüyorsunuz?
- Meditasyon çeşitliliği ve formları hakkında neler düşünüyorsunuz?
- Uygulama içindeki kişiselleştirmeler hakkında neler düşünüyorsunuz?
- Sizin bakış açınızdan, uygulamanın olumlu yönleri nelerdir?
- Sizin bakış açınızdan, uygulamanın olumsuz yönleri nelerdir?
- Uygulama hakkındaki düşünceleriniz değişti mi? Eğer öyleyse, nasıl değişti?
- Çevrenizdeki insanlara bu uygulamayı önerir misiniz? Neden?
- Uygulamaya neler eklemeyi ya da uygulamadaki neleri değiştirmeyi isterdiniz?

Phase 3; Semi-Structured Interview Questions (English)

- How was your overall app usage?
- Did the app fulfill your expectations/needs? Why or why not?
- Do you think that this application has helped you? How?
- When did you want to use the app? Why?
- How was your environment while using the application? How did these factors affect you?
- Were there any parts of the app you don't use?
- How clear were the menu labels/icons and instructions?
- Do you think app content, visual information, and design appropriate for its purpose?
- What do you think about the messages, reminders, feedback sent by the application?
- What do you think about the tasks, levels or rewards in the app?
- Did you find the information sufficient?
- Was it exciting and motivating to use the app? Why?
- Was it easy to get familiar with the product? Was it easy to learn?
- Do you think this app is innovative and creative?
-What would you say if you compare this practice with traditional meditation?
-What do you think about the community feature?
-What do you think about technology or service integration into the app?
-What do you think about the variety and forms of meditation?
-What do you think about personalization within the application?
- From your point of view, what are positive aspects of the app(s)?
- From your point of view, what are negative aspects of the app(s)?
- Did your thoughts about the application change? If so, how did it change?
- Would you recommend the app(s) you currently use to other people? Why? Why not?
-What would you add/changed to the application?

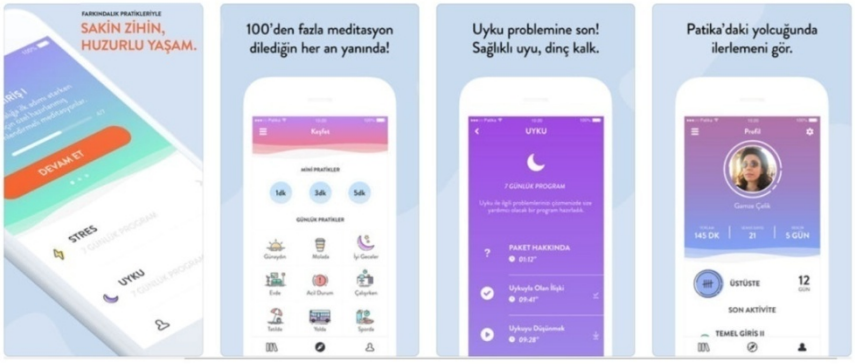
E. Diary Phase Reminder Card (Türkçe)

F. App Selection Card (Turkish)

Pacifica (Yeni Adı: Sanvello)
- Strese, anksiyetiye ve depresyona yardımcı olur.
- İhtiyaca özel meditasyon seçeneği sunar.
- Daha sağlıklı yaşamak için alışkanlık takibi
- Mod ve ilerleme takibi
- Günlük motive edici içerikler
- Diğer kullanıcılarla iletişim

Meditasyon
- Stresini yönet, endişeni azalt ve uyku problemlerini çöz
- İhtiyaca göre meditasyon çeşitleri
- Rahatlatıcı müzikler & sesler
- Nefes egzersizler
- Uyku asistanı

Patika
- Stres, odaklanma, uyku ve motivasyon gibi konularda yardımcı olur.
- İhtiyaca yönelik farklı meditasyon çeşitleri
- Kısa günlük pratikler
- Nefes egzersizler
- Rozet kazanmai



G. Approval Ethics

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY

DUMLUPINAR BULVARI 06800
ÇANKAYA ANKARA/TURKEY
T: +90 312 210 22 91
F: +90 312 210 79 59
www.ueam.metu.edu.tr

Sayı: 28620816 /

03 OCAK 2019

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof.Dr. Gülay HASDOĞAN

Danışmanlığını yaptığınız Yağmur Merve ARIK'ın **"Pozitif Kullanıcı Deneyimi İçin Meditasyon Odaklı Zihinsel Sağlık Uygulamalarının Tasarım İlkeleri"** başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek gerekli onay **2018-FEN-077** protokol numarası ile araştırma yapması onaylanmıştır.

Saygılarımla bilgilerinize sunarım.

Prof. Dr. Tülin GENÇÖZ
Başkan

Prof. Dr. Ayhan SOL
Üye

Prof. Dr. Ayhan Gürbüz DEMİR
Üye

Prof.Dr. Yaşar KONDAKÇI
Üye

Doç. Dr. Emre SELÇUK
Üye

Doç. Dr. Pınar KAYGAN
Üye

Dr. Öğr. Üyesi Ali Emre TURGUT
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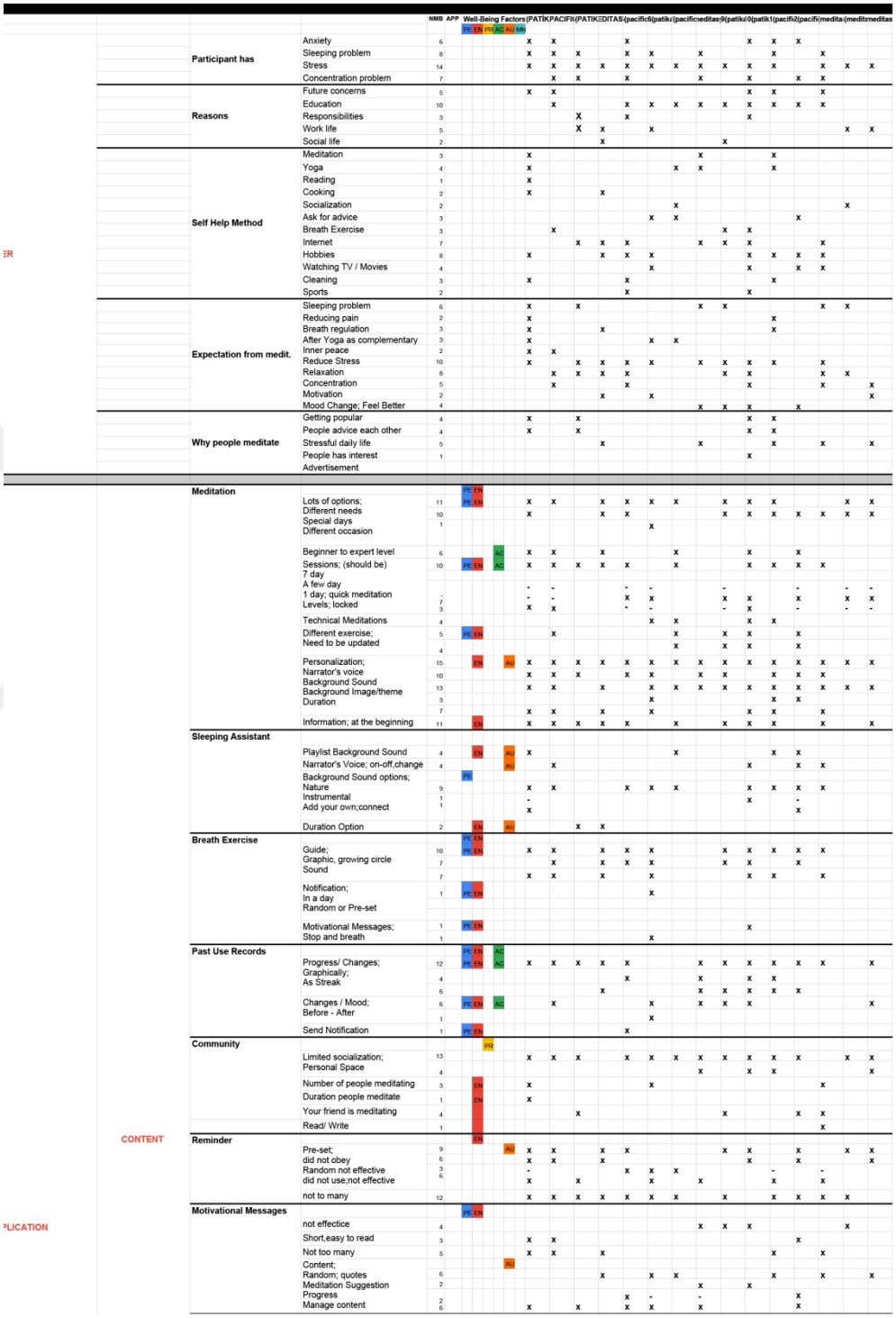
H. List Of Selected App Features

App Name	Cost	Rank&Category Langua&System	Aim	Properties	Meditation		
					Type	Duration	Background Sound
Meditasyon	Free Offers In-App Purchases	1.(Turkey) 4.7 / 5 (9.5K) Health & Fitness Turkish & Eng. ios & android	Stress Anxiety Sleep	Meditation Breathe Exercise Sleeping Assistant Progress / Past Use Community Number of user med. Choose Challanges Set Reminder Reward Invite friends to get free	Guided Meditation -Sessions -According to need -Popular -Daily Recommendation	Options	Ambient (User Choose)
Pacifica (Sanvello)	Free Offers In-App Purchases	86. 4.7 / 5 (1.7K) Health & Fitness English ios & android	Stress Anxiety Sleep	Meditation Health / Hope/ Thoughts/ Goal exercise Progress / Past use Set Reminder Feeling/Mood Assesmnt (For Recommendation) Mood Record Choose Theme(background) Discover article/videos/quotes Community	Guided Meditation - Options for different needs - Today's meditation	Options	Ambient(User Choose) White noise (User Choose
Patika	Free Offers In-App Purchases	41. 4.4 / 5 (644) Health & Fitness Turkish ios & android	Stress Focus Sleep Motivation	Meditation Breathe Exersize Set Reminder Progress / Past Use Reward	Guided Meditation -According to need -Sessions/Levels -Quck meditations	Options (1 - 3 - 5 - +5)	No

	Breathe	Sleeping Asistant	Sound	Visuals	H-C interaction	Daily Messages
Background visual						
Nature Photos	Graphics as asistant	Guide+Relaxing Sound or Relaxing Sound Photos	Ambient Sound + Music	Photos Bright Colors	No	Motivational Quotes
Blured Photos (Fixed)	Graphics as asistant + sound as asistant (optional) + background sound (optional)	Guide+Relaxing sound (optional)	Ambient Sound	Moving Photos Theme	No	Asking Feelings
Colored Backround	Person as assistant	Guided	No	Graphics & Illustations Soft Colors	No	Motivational Quotes

İ. Comprehensive Content Analysis



		Rewards			PE EN		AC																
			Not like competition; not suitable for meditation	8					x	x		x		x	x	x	x			x			
				11							x		x	x	x	x	x	x	x	x	x	x	x
			Meditation related; Accomplishment	3	PE EN		AC		x					x				x					
				1										x									
		Mood/Feeling Record				EN	AC																
			Motivational; Changes before-after	3		EN	AC						x				x		x				
				1													x						
		Relaxing Sound			PE EN																		
			Nature Sound	7					x				x		x		x	x	x	x			
			Relaxing Music	2													x			x			
			White Noise	1													x						
			Personal Favorites	3	PE EN			AU	x						x				x				
			Create Playlist	3	PE EN			AU	x						x				x	x			
		Information		11	PE				x	x	x	x	x		x		x	x		x			x
			How to meditate; Videos	6	PE					x	x	x	x		x		x						
			Graphics	5								x			x	x	x			x			
			Not text	1								x		-									
			Narrator	1								x		-									
												-		x									
			Technical Information;theory	4					x		x							x					x
			Before Beginning	3								x		x			x						
		Splash screen			PE EN																		
			Motivational; How are you today	4	PE EN					x			x				x	x					
				1													x						
			Quotes	1	PE EN													x					
			Task; Take A Deep Breathe	1	PE EN	PR	AC				x												
			Increase happiness																				
			Engagement																				
			Meaning																				
			Social relationship																				
		Questionneire	mood assesment	6					x	x				xx			x	x					
			Better Suggestion	2										x				x					
		Health/Goal/Thought																					
			Make it too complex																				
		Challenges			PE EN		AC																
			Motivational	6					x				x		x		x	x					
			Compete; with yourself not others																				
	INTERFACE	**Theme visuals**			PE																		
			Nature photos	10						x		x	x	x	x			x			x	x	x
			Meditation images																				
			Soft colors	5					x		x					x		x	x				
		Usability																					
			Categorization; Easy to find	8					x			x			x	x	x	x		x			x
			Grouping	3								x			x								x
			Simple/Understandable Title	6										x			x	x			x	x	x
			Understandable Icons	2										x				x					
			Not too many step/setting	5					x		x		x	x					x				
			Color Guidance	1						x													
			Search options	4									x					x		x	x		
			Easily reach target	6					x		x		x			x		x	x				
		Place																					
			Home	15					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
			Nature																				
ENVIRONMENT			Outdoor																				
			Public Transport	2								x						x					
			Meditation Center																				
			Yoga Center																				
			Library	1											x								
		Preferences																					
			Uncrowded / Alone	12					x	x	x	x	x		x		x	x		x	x	x	x
			Quiet	15					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
			No external stimulus	1											x								
ENVIRONMENT			Calm	3							x		x		x								
+			Dark/ Soft Light	10							x	x	x	x		x	x	x	x		x	x	x
USER		**Modifications**																					
			did not	5						x	x		x			x							
			Light	10					x			x		x	x	x		x	x	x		x	x
			Adding some plants	1											x								
			Cleaning Room	3										x	x				x				
		App Itself																					
			Provide light; Different color	4	PE EN					x		x						x			x		
					PE EN			AU																
		Technology Integration																					
ENVIRONMENT			Smart Watch	5	PE EN				x		x				x			x	x				
+			Light Change	8	PE EN			AU		x		x		x		x		x	x		x		x
APP			Hearth rate track	6	PE EN				x				x	x	x			x	x				
			Breathe Track	3	PE EN								x	x	x								
			..... for others																				
			decrease spirituality	2						x									x				
			too much effort	3												x				x		x	
		Being user-friendly		8	PE EN				x	x	x	x	x					x	x	x			
		Being Facilitative		14	PE EN					x	x	x	x	x	x	x	x	x	x	x	x	x	x
			Being accessible	8	PE EN					x	x			x	x	x				x	x		
		Being Effective		15	PE EN				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		Being Exciting		10	PE EN				X	x		x		x	x		x	x	x	x			x
			Setting goals	5		EN		AU				x		x	x		x	x					
			Reward system	2	PE EN		AC		x											x			
			Challanges	5	PE EN		AC		x						x		x		x				x
USER		**Creating Self-Awareness**		12					x	x	x		x	x	x	x	x	x	x	x			x
+			Self-Tracking	9		EN	AC			x	x		x	x	x	x	x	x		x			
APP			Show progress/changes	10	PE EN		AC		x	x	x		x	x	x			x	x	x			x
			past usage record	11					x	x	x		x	x	x	x		x	x	x			
		Keep Active Involvement		12		EN			x		x	x	x	x	x		x	x	x	x	x		x
			Setting goals	5		EN		AU				x		x	x		x	x					
			Reward system	2	PE EN		AC		x											x			
			Challanges	5	PE EN		AC		x						x		x		x				x
			Sessions	9					x		x	x	x	x	x			x	x	x			
		Being Need-Oriented		11					x	x	x	x	x	x			x	x	x	x	x		
		Allowing Personalization		8	PE EN			AU	x				x	x		x		x	x	x	x		