

A Study on Interface Design of Meditation App for Improving Mental Health of Adolescents

Myung-Hee Cha¹, Woo-Kyung Lee^{2*}

Abstract

In the past few years, the suicide rate of youth in Korea has risen rapidly, and it is recognized as a social problem. It is known that the happiness index of Korean youth is the lowest among OECD countries. Adolescents are exposed to a lot of stress such as academic burden, conflict in peer relations, and family problems, and psychological disorders such as depression, obsessive-compulsive disorder, and anxiety disorder are known to increase the suicide rate of adolescents. In the West, many studies have been reported using meditation apps for psychological health of adults. In particular, psychotherapy methods based on mindfulness meditation are being developed and commercialized as meditation apps or psychotherapy apps. This study aims to dynamically implement mind management contents by adding music/movements corresponding to art therapy to complement the limitations of existing static meditation techniques and boring meditation music and make them friendly to adolescents. To this end, we will analyze the existing meditation app interface design case and present a design concept guideline for the meditation app Koala for youth.

Keyword : mindfulness meditation mind/body medicine, Self-harm behavior, youth self-harm, daily stress, cognitive emotional regulation strategy, moderating effect

I. Introduction

In addition to school violence, which has recently become a social issue among adolescents, problematic behaviors such as self-harm behavior are increasingly increasing, which is pointed out as threatening the mental health of adolescents [1]. The causes of these problematic behaviors are internalized psychological problems such as depression or anxiety or pain or anger expression and anger expression. It can be classified into externalization problems such as behavioral disorder. Often, adolescents show self-harm or other problematic behaviors in an attempt to escape from painful emotions [2]. In particular, it is well known that adolescents, who are less capable of recognizing, understanding,

1 Faculty of Dept. of Beauty Design Seoul Cyber University, Seoul, Korea [Professor]

e-mail: princess@iscu.ac.kr

2 Faculty of Dept. of Counseling Psychology Seoul Cyber University, Seoul, Korea [Professor]

e-mail: wisemind96@iscu.ac.kr (Corresponding author)

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and expressing their own feelings, focus on emotional behavior in order to avoid the stress or emotional pain they experience in their daily lives [3].

The treatment programs for mental health of adolescents who show problem behavior mainly consist of traditional cognitive behavioral therapy and social skills training. Recently, mindfulness cognitive therapy, the third trend in cognitive behavioral therapy, has been applied to adolescent counseling and psychotherapy. Mindfulness is a concept derived from the Zen Buddhism tradition, meaning intentionally paying attention to what is happening in “here and now”. The effectiveness of mindfulness-based treatment programs has been proven in a variety of psychological disorders. In particular, in the case of MBSR(Mindfulness Based Stress Reduction), a stress reduction training developed by Kabat-Zinn, it has been reported to be effective in improving chronic pain, depression, anxiety disorders, and panic disorders . Recently, mindfulness meditation-based psychotherapy has been reported to be effective in improving the psychological well-being of adolescents [4]. In Korea, it is also reported to be effective for adolescents with depression and test anxiety [5].

Until now, app development and application that systematically applied meditation or psychotherapy programs to adolescents have not been developed and applied in Korea, and evidence-based effect research has not been conducted. In particular, in countries where IT technology is developed and the spread of smartphones is high, such as in Korea, the development of self-healing programs using smartphone apps is very necessary for adolescent mental health. Moreover, adolescents have low participation in the existing face-to-face psychotherapy due to stigma, but if they use a smartphone app, they will be able to increase their participation. Therefore, in this study, we developed a mind management meditation app (tentative name: koala (my mind breathing through my nose)) that makes it easy for adolescents to access any moment of psychological pain at any time without limitation of time and space and to find their own peace of mind.

In a self-healing mind management app based on meditation, adolescents often see depression and anxiety (test anxiety, presentation anxiety), interpersonal relationships (peer relationships and parent-child relationships), lower self-esteem, problems with emotional control (aggression, self-harm, violence). Problems, etc.), sleep problems, and eating problems. The meditation app developed in this study targets adolescents with prognostic symptoms before a serious disability occurs, and deals with depression, anxiety, interpersonal problems and family conflicts, low self-esteem problems, eating problems, etc. I want to prevent the occurrence of. To deal with these problem areas, this study intends to utilize not only mindfulness meditation but also traditional psychotherapy techniques such as psychoeducation, self-monitoring, problem solving, cognitive correction, guided image training, and relaxation [6].

This study aims to analyze the existing meditation app interface design case and present the design concept guidelines for the meditation app koala for youth. Chapter 2 analyzes existing cases of meditation app design with existing research. Chapter 3, which is the main subject, describes the content design of the youth mindfulness meditation app koala. Chapter 4 describes koala app design that applies the latest app design trends and app design content preferred by teenagers. Finally, Chapter 5 describes the conclusions and future studies [7].

2. Existing research

2.1 Meditation Application Market Trend and Prospect

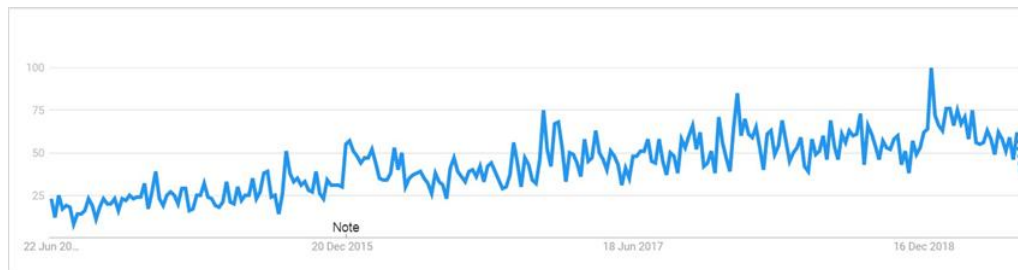
In the 'Understanding and Managing Stress' thesis, it appears that meditation helps relieve tension in the mind through breathing, and helps in reducing stress by gaining insights into yourself and the world around you. It is also known to have positive effects on learning improvement, health promotion, performance improvement, drug addiction treatment, psychotherapy, and self-discipline.

The Wall Street Journal (WSJ) reported that the U.S. meditation population has tripled over the past five years as of 2019, and more than 2,000 meditation applications have been released over the past three years, bringing a total size of the meditation industry to \$1.2 billion (approximately 1.3 trillion won). It is reported that it is evaluated as. [Fig. 1] shows 2019 Best Revenue Health & Fitness Applications Ranking.



[Fig. 1] 2019 Best Revenue Health & Fitness Applications Ranking

As a result of examining the degree of interest in meditation applications in the United States through Google Trends, it has continued to grow, but as of December 16, 2018, the degree of interest has declined, indicating that the growth is gradually slowing down as the fierce market. Developing unique contents that enable vivid experiences using AR and VR, popular meditation class experience services using data, or diversifying profit models by developing various types of products can also be a method. [Fig. 2] shows Google Trends.



[Fig. 2] Google Trends (2010.6.22.~2018.12.16.)

2.2 Meditation App Case Study

Existing similar apps include Calm, Shine, and 10% Happier in overseas, and Mabo and elephants secure many users in Korea, and are used to sleep and self-care. It is being used, and a VR meditation app has also been commercialized and is being used by users.

Calm, a representative meditation app, offers a variety of meditations such as “7 Days of Calm” for beginners in meditation, “Daily Calm” for one-day class, and “Good Night Story” to encourage comfortable sleep. Music from popular artists such as Sam Smith's ‘How Do You Sleep’ and Sabrina Carpenter's ‘Exhale’, which are not classic meditation music, are also listed, so you can choose and use them according to your taste. The headspace meditation app allows you to choose a voice that is comfortable to hear among men and women, and you can also adjust the speed, which stands out for its delicate consideration for subscribers.

Mabo is a representative app among meditation apps in Korea. “Mabo”, an abbreviation for “Mind View”, is the first mindfulness meditation app in Korea. “Mabo Keeper” and CEO Yoo Jeong-eun of the Korea Inner Search Institute tells the story in person. It can be used whenever and wherever you want to look into your mind, such as when you don't want to do anything, when you're angry, when you're working, when you're eating, etc. The community is active, so you can share experiences and

give comfort and help in real time.

Recently, meditation apps using VR and AR are also actively being produced. General meditation apps experience the process of meditation according to Gru's voice guide, which leads the meditation process with 'close eyes' [8]. VR apps centered on visual experiences are distinguished from existing smartphone meditation apps. Dozens of VR meditation apps have already been released overseas, but it is difficult to find those developed by Korean companies. This is because there are various opportunities (religions) to meditate offline in Korea. Most of the overseas VR meditation apps have titles that include the word Meditation, but the word has a broader meaning than what we think of meditation because it includes Buddhist or Hindu meditation, non-religious meditation and Christian meditation.

The Guided Meditation VR app is the first VR meditation app released in 2016. It shows the beauty of the natural scenery out of everyday life through sophisticated 3D modeling, provides a natural environment for about 27 meditations, and has enough play time of about 16 hours. Users can select the meditation type, background music, narration, and time setting that suits them [9]. The WiseMind app is a platform for mindfulness developed with psychotherapists and scholars and is used to improve the health of patients in hospitals. There are three contents, including Taijiquan, building a stone tower, and breathing practice, and the interface that allows people who do not know taijiquan to imitate the movements of taijiquan is unique. In breathing training, the interface expressed like a strong wind is interesting. [Fig. 3] shows VR meditation app example.



[Fig. 3] VR meditation app example

3. Adolescent psychotherapy meditation app koala content design

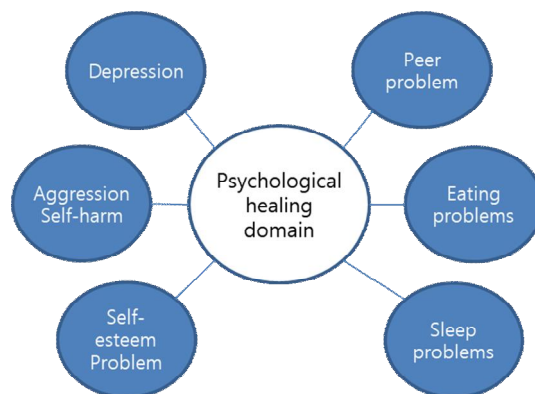
3.1 Clinical and Developmental Psychology

- ① Depression and Anxiety Area: For adolescents with mild to moderate depression, test anxiety, and presentation anxiety for healthy adaptation and development in adolescence, meditation and

psychological techniques that can be used when anxiety or depression are used are composed of contents [10].

- ② Aggression, self-harm (difficulty controlling emotions): The content is composed of psychological techniques and meditation to prevent self-harm and aggressive behavior caused by emotional pain caused by sudden changes in body and emotions during adolescence.
- ③ Self-esteem problem: When adolescents experience reduced self-esteem and psychological pain due to complex stress such as school violence, poor schooling, and abuse, self-healing contents related to self-esteem recovery are organized. Skills training to in]crease self-esteem and various psychological techniques are used to increase resilience.
- ④ Relationship problems (peer relationships, etc.): It consists of various interpersonal conflict resolution measures and problem solving methods to recover the conflict of students who have difficulties in their daily lives due to instability caused by relationships with other people.
- ⑤ Sleep Problems: It aims to establish healthy sleep habits for teenagers with irregular sleep to check their own sleep hygiene and to use psychological techniques such as imagery, relaxation techniques, and meditation for sleep hygiene before falling asleep.
- ⑥ Eating problem: Contents are designed to allow teenagers with unhealthy eating habits to establish a healthy body image and to accept and respect their own body due to distortion of the body.

[Fig. 4] shows Main areas of psychological healing content.



[Fig. 4] Main areas of psychological healing content

3.2 Motion therapy

Existing meditation apps and psychological healing apps consist of boring meditation music and

almost no movement, but the youth mind management meditation app that is intended to be developed in this study reflects the preferences of adolescents to reflect music therapy elements and dance/motion therapy content. Try to implement At this stage, the planning and direction of music/movements for mind healing (meditation app) are set. Human emotions appear as body reactions and actions. Therefore, we plan to develop a dynamic form with music, dance/motion therapy elements added by implementing virtual reality (VR) based on actual movements. Specifically, we discuss how to use VR to combine it with physical reactions, visual images, and verbal guidance. The strategies expected to be dealt with at the core are body recognition, spatial awareness, energy control, self-assertion, relaxation training, empathy, anger control, ignoring skill, and grounding techniques. Unlike traditional static meditation, this approach is dynamic and utilizes immediate audiovisual stimuli that can lead to attention. In other words, it lays the foundation for a body-based mindfulness strategy that considers the developmental context of adolescents.

3.3 Music therapy

Musical use in meditation is classified as a receptive music therapy technique in music therapy. Receptive music therapy techniques are divided into improvisation, singing, and appreciation, and musical use in meditation is a sentimental method. Bruscia, in his book *Defining Music Therapy*, describes musical experiences in receptive music therapy as clients listen to music and talk about these experiences in silence, verbally, or in some other way. In meditation music, music is sometimes used for relaxation purposes, or it stimulates the image to help the client have a specific experience. At this time, music for relaxation and music for image show differences between musical elements. In general, relaxation music maintains a consistent beat and has a predictable characteristic without any change in semantically with a quiet atmosphere, whereas music for imagery has various changes in instrumental composition and sensationalism, and these changes bring new and interesting musical ideas The creation process stimulates the image of the client. Therefore, musical use for meditation is divided into music according to the purpose of meditation. [Table 1] shows Musical features for relaxation and image.

[Table 1] Musical features for relaxation and image

Music for relaxation	Music for images
The tempo is consistent and stable	Variety of tempo changes.
The tempo is slow	The tempo is very slow, but in contrast there may be sections with a fast tempo.
Consistency of 2 or 3 nights is maintained.	Image stimulation with frequent movements of 2 and 3 nights.

The melody is predictable.	The melody is unpredictable.
The pitch range is narrow (sequential progression).	The pitch range is wide (leap forward).
The phrase is matched to the inhalation and exhalation of the breath.	Phrase can be constant or varied.
The structure of Mars is compositional, consonant.	The structure of Mars is multivariate, including dissonance.
The musical instrument group consists of string instruments, woodwind instruments, Brass and percussion instruments are excluded.	Combination of various musical instruments.
Legato and pizzicato baseline use	Use of provincial methods to emphasize legato, staccato, pizzicato, marcato, etc.
There is little change in semester.	Changes in the mindset vary within a non-threatening range.
Repetitive	Variations are used to stimulate the image.
Supportive baseline	Baseline supportive or not.

For teenagers, among the music that teenagers prefer, performance music without lyrics, trance music, and Indian music are used. In particular, adolescents' musical preferences are very strong, and since this plays an important role in revealing adolescents' identities, it can be selected and used from music that considers the preferences of adolescents as much as possible without causing unnecessary image stimulation or inappropriate emotions and thoughts.

(1) Meditation music

Meditation music has a variety of styles and instrumental arrangements. The monophonic rhythm using a woodwind instrument mimics the flow of breathing. Tibetan musical instruments (Tibetan bells, finger cymbals, singing bowls) are sometimes used to allow space for the sound. Music with a spatial mystical character helps the subject to deeply relax in a meditative state.

(2) trance music

For adolescents, there are many cases of using trance music that is differentiated from existing meditation music as relaxation music. Trance music is one of the electronic dance music styles. In general, a melodic synth passage that repeats at a tempo of 130-160 beats per minute, a music format composed of up and down, and crescendo are harmonized, and vocals are also applied at this time. do. The trance music makes the listener feel a dreamy atmosphere and the repetitive melody is immersed in it.

(3) Youth and music

Music preferred to adolescents can induce positive emotional change in adolescents with mental

illness. According to a study by Gold et al., the type of music use in adolescence can be a major indicator of the mental health of adolescents. The considerations in the composition of youth meditation music are musical preference, purpose of meditation, content of script, and voice that induces meditation. [Fig. 5] shows Content design by area.

Psychotherapy	Music therapy	Motion therapy	meditation
• Anxiety (including compulsion), problems with anger control • Difficulty learning and attention • Eating and sleeping • Trauma and abuse	• Music-New Age, Hip-Hop, Song, Classic • Sound-natural sounds, percussion sounds	• motion • Breathing and movement • Virtual experience motion	• Goodnight meditation • Meditation to get along with friends • Test tweezers meditation

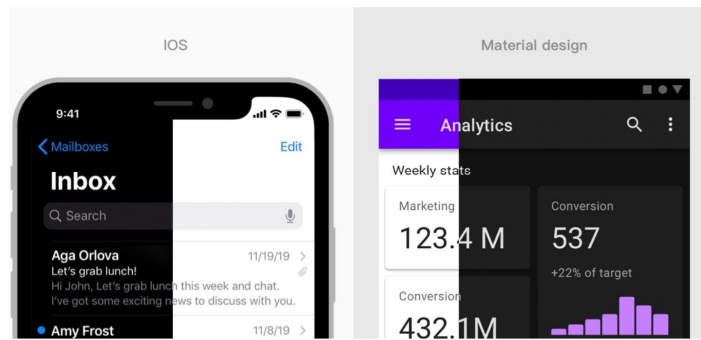
[Fig. 5] Content design by area

4. Koala Design Guide Design

According to statistical data, 94% of the satisfaction index of an app downloaded by a mobile app user for the first time is determined by the first exposed design such as the app icon and the intro screen. Design isn't necessarily an indicator of app success, but it's clear that it's a big role to impress users. UX focuses on enhancing customer satisfaction by providing optimal app usability and comfort such as familiarity to users, but UI focuses on aesthetics such as the color of the app and the beauty of animation.

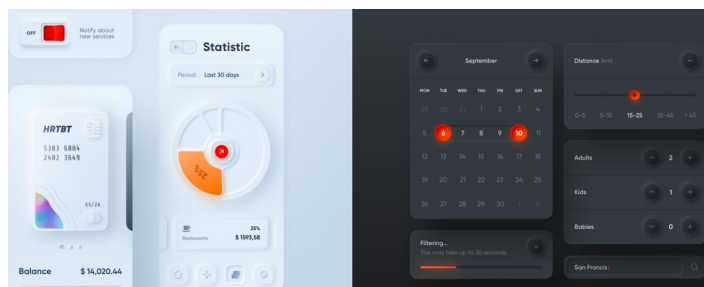
4.1 UX/UI design trends

- Dark mode: Following the appearance of ios13 dark mode in 2019, large-scale applications will continue to be popular with the release of this feature, and research is ongoing in terms of visibility and implementation cost. [Fig. 6] shows ios13 dark mode.



[Fig. 6] ios13 dark mode

- New imitation: Design trends are evolving day by day, and design trends that express objects realistically once again after flat design are on the rise. The new way of imitating things is evolving in the direction of improving and innovating the existing imitating style. In the new MAC OS system, Big Sur, some gradations, projections, and highlights have been added to the icon design, making the elements within the icon more natural. [Fig. 7] shows MAC OS system Big Sur.



[Fig. 7] MAC OS system Big Sur

- Colorful Colors: The variety of color options and the intense contrast of conflicting colors effectively provide a visual experience.
- Font decoration: IOS 11 uses a larger and thicker title font to emphasize the central content over other content.
- Larger fillet: Rounded corners are larger than in the past, and margins have been increased with the use of larger fonts. This provides a breathable and transparent visual experience.
- Rich illustration: The richness of UI illustration has begun to be reflected in style and content. As for the style, 3D style started to be popular, and for content, Narrative illustration method started to be popular.
- Multidimensional animation expression: With animation becoming a new trend, three-dimensional

animation has become more popular than before, and visual experiences have been enriched.

4.2 Koala UX/UI design

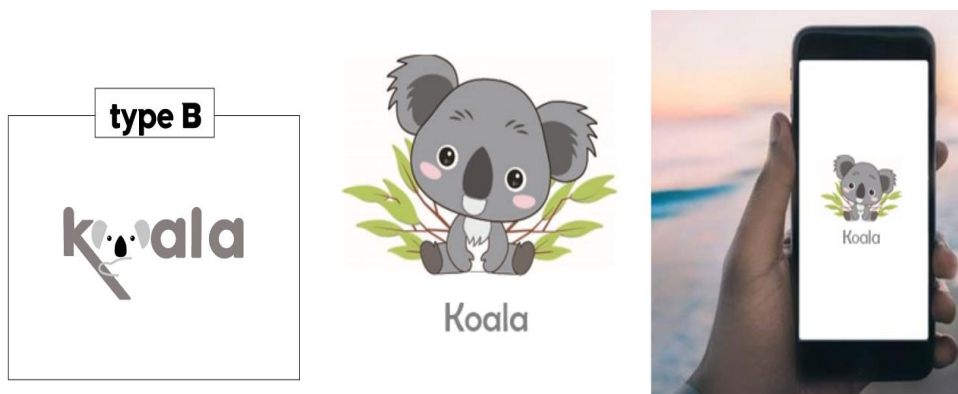
Existing apps such as screen composition, UX/UI, navigation, and page content necessary for youth mindfulness are benchmarked and used in the planning stage. When benchmarking and overall app planning are completed, create a sitemap. Each page (screen) is schematically structured so that you can see the entire composition of the app at a glance. The webtoon method or game method that teenagers are enthusiastic about is applied to the design to increase accessibility and practicality.

The UX/UI trend results benchmarked by existing meditation apps are as follows.

1. Overall, there is a tendency to follow the Flat Design Trend.
2. It is difficult to find a skeuomorphic design as in the past.
3. There may be times when it is more effective to use a graphic style that suits each situation rather than a single graphic style.

4.2.1 Creating a style guide

Style guides are a component of the app interface. The guide is like a painter's color palette. When creating a UI, you can think of it as a collection of elements, fonts, colors, and icons that you can choose from. All these aggregates should be produced as the result of the app design work. In addition, the developer codes the app interface and should implement it according to the relevant guide when implementing it. Examples of various illustrations app. [Fig. 8] shows Koala character design.



[Fig. 8] Koala character design

Among the design trends in 4.1, the design preferred by teenagers is applied and used for design.

Teenagers prefer illustration and animation. In addition, colors are more interesting to colorful colors and I like large letters. In addition, based on the analysis of the existing meditation app, driving users' actions through natural contexts requires an effective and comprehensive approach than drawing affordances through graphic styles.

① Koala design guide design

- Project Goal: Designing a mindfulness meditation app with the latest design trends preferred by teenagers

② Screen design: Composed of Main, Meditation Category, and My Meditation

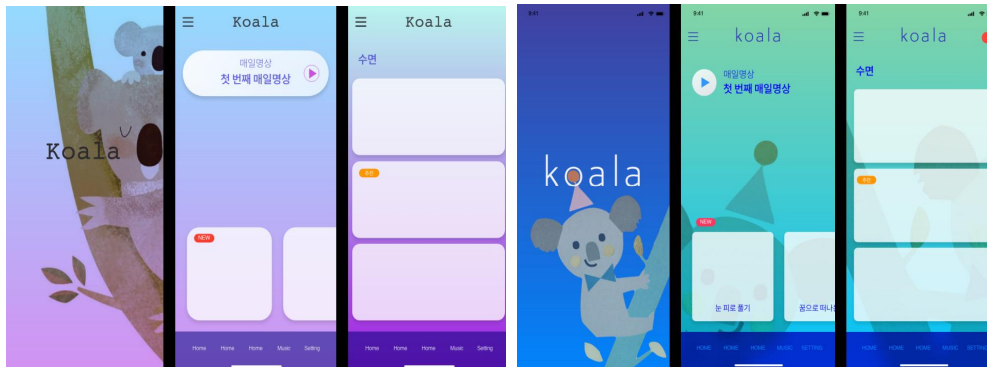
- Main: The main screen is designed to guide users.

- Use bright and warm main colors and illustrations.
- Implementing an app image that reminds you of 'meditation' through illustrator work that can make full use of warm and sophisticated illustrations.
- Add koala animation to the content page.
- At the top of the screen, there is a screen to search for specific situations, and meditation is recommended to users who do not know what kind of meditation to listen to.

- Meditation Category

- Maximize user convenience by dividing meditations by topic and arranging them on the screen.
- Psychological education meditation, movement/dance meditation, music/sound meditation, and healing/mindfulness meditation are guided to find meditation tailored to youth users.
- Design an illustration so that it is easy to understand the category.

[Fig. 9][Fig. 10] shows Koala App Style Suggestion.



[Fig. 9] Koala App Style Suggestion



[Fig. 10] Design by category

● My Meditation

- Induce meditation by giving a meditation grade through the contrast of other users' meditation time.
- Organize so that you can see the list of other favorite meditations and meditations you have heard.

② Create a rendered app screen composition design

This is the step of performing design work based on the composition of the UX wireframe with all elements of the style guide. App design is also the result of great app design by following a trending pattern or creating a new one with the idea that it is similar to fashion design.

5. Conclusion and future research

In this study, the study aims to dynamically implement mind management contents by adding music/movements corresponding to art therapy to complement the limitations of the existing static meditation method and boring meditation music and make it friendly to adolescents. To this end, an analysis of the existing meditation app interface design case and a design concept guideline for the koala, a meditation app for teenagers, were presented. Among the design trends, the designs preferred by teenagers were applied to illustrations and animations. In addition, based on the analysis of the existing meditation app, eliciting the user's behavior through a natural context is an effective and comprehensive approach than eliciting affordance through a graphic style.

Afterwards, it was judged that adolescents with low concentration could induce a sense of immersion, activeness, and interest that cannot be provided in general content through synesthesia. Among the treatment categories of this study, depression and anxiety, self-esteem, and aggression were found. We intend to conduct in-depth research with self-harm as a representative subject area. In the study of the

effect of the mind management app, the effect is studied after using the app for at least 4 to 8 weeks by subject (depression, anxiety, interpersonal relationships, self-esteem, etc.). Let about 20 adolescents use the app as a pilot test, and examine the feasibility of the meditation app developed in this study. At this time, the degree of change of adolescents according to app preferences from the viewpoint of dance movement therapy and music therapy is tested. In addition, after the pilot test, when the app development is completed, the pre- and post-effect study can be conducted by allowing adolescents who show actual mild-moderate maladjustment to use the app.

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