

A study of experience design for online-to-offline mindfulness training

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Abstract

Background: Experience design originated from the development of the experience economy at the end of the last century. With the advancement of technology, especially the development of smart mobile devices, experience design plays an increasingly significant role in the field of human-computer interaction. Experience design and smart mobile devices provide opportunities and methods for the development of mindfulness.

Objective: The purpose of this study was to develop a prototype of a mindfulness app (application). This prototype was used as an information platform to connect online mindfulness training and offline activities to provide mindfulness app users with new mindfulness experiences.

Literature review: This provided theoretical support for the design of the app prototype by identifying relevant literature research regarding experience design, service design, co-creation, and mindfulness.

Method: This study was divided into three phases. The first phase was theoretical research, providing theoretical guidance and methods for collecting and analysing data. The second phase was data research. Based on the data analysis of the mindfulness app market, four apps were selected for in-depth case studies. The third phase was app development, which included the following four stages: app structure, low-fidelity prototype, high-fidelity prototype, and functional demonstration.

Findings: Using research into the market data of the mindfulness apps, four mindfulness apps were selected and their characteristics were analysed.

Discussion: Using the five planes of the elements of the user experience model, the data from the four apps was analysed to understand the basic needs of users regarding mindfulness apps, which are online mindfulness sessions and profile, to guide the next phase of the prototype design.

App development: Four stages were included in the app prototype development in this study. First, the app structure was determined from the results of the discussion section. After that, the low-fidelity prototype and then the high-fidelity prototype were optimised and iterated. Next, the iterated high-fidelity prototype was imported into the software for functional demonstrations to achieve app functionality and the research objective.

Conclusion: This study designed an app prototype to connect online mindfulness training and offline mindfulness activities. The prototype was used as an information platform to provide users with new mindfulness app experiences. It could also serve as a research framework to guide further related research.

Keywords: experience design, app prototype, mindfulness, online, offline activities

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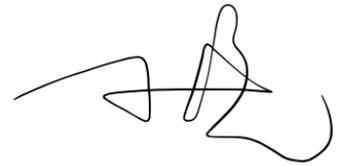
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Attestation of Authorship

“I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the Acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.”

A handwritten signature in black ink, consisting of several overlapping loops and a long horizontal stroke extending to the left.

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1. Introduction

1.1 Background

The concept of experience design originated from the experience economy, as proposed by Pine and Gilmore (1998). User experience includes not only one-way acceptance by users of the environment, products and services, but also involves a two-way interaction (Pullman & Gross, 2004). According to Pine and Gilmore (2011), the development of the experience economy represents a new direction for enterprise development, and experience-centred services have begun to replace traditional services centred on transactions. In this context, the emergence of the concept of experience design has had a significant impact on the development of user experience, especially in the field of human-computer interaction (Norman, 2013). With the popularisation of smart mobile devices, the development of the field of human-computer interaction has also increasingly affected the development of different areas.

“Live in the present moment is advice that has been around for centuries. Mindfulness is a particular way of paying attention, it is increasingly discussed and practiced in contemporary Western culture” (Nagy & Baer, 2017, p 353). Kabat-Zinn (1990) argued that mindfulness is the perception and sensation of the present moment, using a non-judgmental way to feel the surrounding environment. Many studies have shown that people can relieve stress, anxiety, insomnia and bipolar disorder by practicing mindfulness (Edwards, Bryning & Crane, 2015). Mindfulness has been applied in

different fields, such as business (Antanaitis, 2015), education (Chulguen & Goralski, 2016), and health (Ebrahim, Mojtaba, Fahime, Sepide, & Said, 2017). Nowadays, with the rapid development of mobile Internet technology, mobile applications provide more opportunities for the development of mindfulness.

1.2 Research question

The research question of this study is: what are the improved features that shall be taken into consideration in the design of a mindfulness app based on analysis of competitors. Mindfulness apps currently lack online-to-offline connections. Solving this issue could help users who take mindfulness training improve their experience.

1.3 Objectives

The purpose of this study is to offer a new mindfulness app for users. This study explores the prototyping of the new mobile app. The new mindfulness app prototype is an information platform which allows users and organisations to publish information content, in order to provide a connected service between users' online-to-offline mindfulness training.

2. Literature review

2.1 Overview

This chapter situates the study in the literature by reviewing the major developments in experience design, service design, co-creation, and mindfulness.

2.2 Experience design

Experience design is defined as a method that focuses on improving the quality of user experience and applies to the interactive experience process. This method includes the guidance, stimulation, and prediction of user behaviours (Allanwood & Beare, 2014).

User experience represents the two-way interaction between users and products, including both tangible and intangible services (Rawson, Duncan & Jones, 2013). The tangible product in this project is the mindfulness app prototype, and the intangible service is using service design to improve service quality and the user experience.

There are many touch points in the overall user experience process, and these touch points are direct and indirect interactions between the user and the service provider (Grewal, Levy & Kumar, 2009). Service-oriented experience design highlights the importance of touch points, because user experience comes from the touch points that create interactions between the user and the service provider. Researchers in the design field believe that a

good experience design enables user experience to transcend the transaction process itself, giving users an unforgettable experience (Zomerdijk & Voss, 2010). Reasonable design and optimisation of the user experience can improve the satisfaction and loyalty of users (Rawson et al., 2013). This study aimed to improve the quality of the mindfulness experience by designing and optimising the entire process of online-to-offline mindfulness training.

2.3 Service design

As an essential part of experience design, service design played a significant role in this research. Service design is defined as user-centric and comprehensive service innovation, and includes the improvement of existing services and the creation of new service methods (Chen & Chen, 2012). The process of service design is iteration, based on design methods which include exploration, analysis, reflection and implementation (Brown, 2008). Kimbell (2011) argued that different methods and tools can be used in different disciplines in service design, including ethnography, sociology, information management, and interaction design. The concept of service design may be exported visually, using different presentation methods depending on the culture, skills, and levels of understanding of stakeholders involved in the service process (Morelli, 2006). Service design thinking and methods provide guidance for analysing existing mindfulness services and exploring new design directions.

Many different areas have contributed to the development of service design, such as business marketing and operations management in the management field, and user experience in the design field (Sampson, 2012). In the area of app design, the rational use of service design methods, based on a thorough understanding of existing mindfulness apps, can provide better experiences and new products for mindfulness users.

2.4 Co-creation

According to Fernandes and Remelhe (2016), co-creation is a requirement-centred interactive process which involves at least two participants. They integrate resources to achieve a win-win situation and create value (Jaakkola, Helkkula & Aarikka, 2015). In the co-creation process, if the service provider pays more attention to the participation of the user than in the traditional relationship between the service provider and the user, it is more likely that a win-win situation will be achieved for the service provider and the user. Organisations could learn from customers by using a process of continuous participation and communication to improve the organisation itself (Jaakkola et al., 2015).

In the process of designing the online-to-offline mindfulness app, if users participate in the creation of information content and use co-creation to enrich the content of the app to improve the app itself, it is more likely that a win-win situation will be achieved between the user and the app.

Co-creation is considered to be a new form of marketing innovation and provides new insights into exploring experiences (Buonincontri, Morvillo, Okumus & Niekerk, 2017). Researchers have argued that the relationship between users and companies has changed. The strategy for creating business value is no longer enterprise-centric, which focuses on products and services. Instead, users and businesses create value together. The personal experience of customers is included in the process, and users are allowed to develop experiences that suit their actual situation (Prahalad & Ramaswamy, 2004). Related research shows that co-creation has a positive impact on user satisfaction (Griseemann & Stokburger, 2012). These studies provide theoretical support for the use of co-creation in creating the mindfulness app.

2.5 Mindfulness

Mindfulness is a meditation-based training method that guides participants to focus on the present moment to achieve the purpose of improving physical and mental health (Suyi, Meredith & Khan, 2017). In the oriental culture, mindfulness means having a right mind. It originated in the Pali language of Buddhism, and means the source of thoughts and desires. Meditation is used in Buddhism to train concentration, so that practitioners can maintain a correct and positive thinking mode. However, the meditation in mindfulness in the middle of the 20th century was regarded as a tool to instruct the mind, and did not involve religious content. Suzuki created a modern interpretation of Zen in order to adapt it to the Western cultural background (Fromm & Suzuki, 1960). The books he published

are widely recognised in Western countries, and Zen Buddhism began to spread in the West. Many scholars interested in Zen started to study and research Zen. One of them was Jon Kabat-Zinn. He was a professor of health care, medicine, and sociology. Combining the study of Buddhism with his academic research, he created mindfulness-based stress reduction (MBSR), which is offered by medical centres, hospitals, and health organisations (Avinash, 2016). He taught mindfulness to help people relieve stress, anxiety, pain and illness.

According to relevant surveys, mindfulness is becoming more and more popular in daily life (Chambers, Gullone & Allen, 2009). With the rapid development of mobile Internet technology, many applications have begun to provide services related to mindfulness (Chittaro & Vianello, 2016). However, most of the existing mindfulness apps are available for online learning only. Offline mindfulness activities have not been integrated into online resources. According to the data from the case studies below, an online-to-offline service is not included in most mindfulness apps. The purpose of this study was to provide a complete user experience of online mindfulness to offline mindfulness through experience design, service design and co-creation methods.

3. Methodology statement and project-specific methods

3.1 Overview

As noted earlier, most of the existing mindfulness apps are available for online learning. However, the online-to-offline connection service is not included in most mindfulness apps. Therefore, the purpose of this study was to design an app prototype as a platform linking online and offline mindfulness activities to provide users with new mindfulness experiences. This section describes the research method used to fulfill the aim of this study.

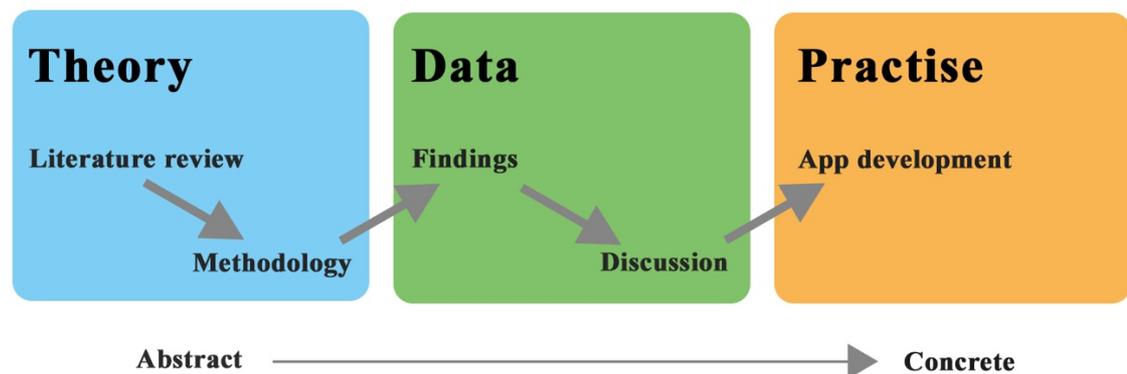


Figure 1. The three phases of this study. Made by author.

As shown in Figure 1, there were three phases in this study. The first phase was the theoretical research, which consisted of literature review and methodology. The purpose of this stage was to study existing theories relating to this project, to discover the research

gap and provide theoretical support. This stage provided the methods for data collection and analysis. The second stage was data collection and analysis, consisting of the findings and the discussion. This stage provided support for the third phase — app development. The whole process of the methodology in this study went from abstract theoretical research to concrete practice.

3.2 Selection of methodology

In the data research phase, this study used the elements of the user experience model in case studies (Garrett, 2002). The user experience model is a user experience analysis method that was proposed in 2002. This theory was mainly used in the field of web design at that time. With the development of smart mobile devices, the information displayed on the web pages is transferred to the mobile device. This model was retained has been applied to mobile device app design. Although the equipment is different, this model is still recognised in academic research. By April 2018, this user experience analysis method had been cited more than 1900 times in the Google Scholar database (Google Scholar, 2018). The model guides improvements regarding user experience of products through in-depth analysis of the product information. Therefore, this study used this model to analyse products in the app market to understand basic user requirements and usage habits. The results obtained provided support for the app development phase. The app prototype in this study realised the new concepts. Meanwhile, the app ensures that the

basic needs of users are met. In addition, the study of market conditions helped avoid duplication and similarity between the app prototype in this study and existing mindfulness apps.

In the app development phase, the app prototype design was achieved through theoretical research and case studies combined with hand-painting and drawing software. At the beginning of the app development, the software was used to outline a structural diagram according to the functions required by the app prototype. Afterwards, the low-fidelity prototype map was created by using hand-painting and software to determine the position of the functional area within the app prototype. After the low-fidelity prototype was completed, the high-fidelity prototype was created by the software. The high-fidelity prototype was then imported into the interaction design software and the operation of the app prototype was displayed on the mobile phone. During the app development, formal user testing was not possible due to ethical constraints; there was however informal testing of ideas by fellow students and the supervisor.

3.3 The collection and analysis of the data

The purpose of the case study in this study was to analyse the basic functional needs and usage habits of users in the current mindfulness app market. It was necessary to select apps that were popular and used by a large number of users. According to the research by Statista (2018), the Android mobile operating system and iOS (Apple Operation System)

market share accounts for 99.8%. Therefore, the app market was mainly composed of the Android and iOS application stores.

In this study, the top 15 apps relating to mindfulness in the Android and iOS online app stores were selected for further research. By analysing the app data provided by the app stores and ASO100 websites, the four most popular mindfulness apps were selected. The ASO100 website is a professional mobile application data analysis platform, which provides businesses, developers, and investors with app data services. The data covers 155 countries and regions around the world (ASO100, 2018).

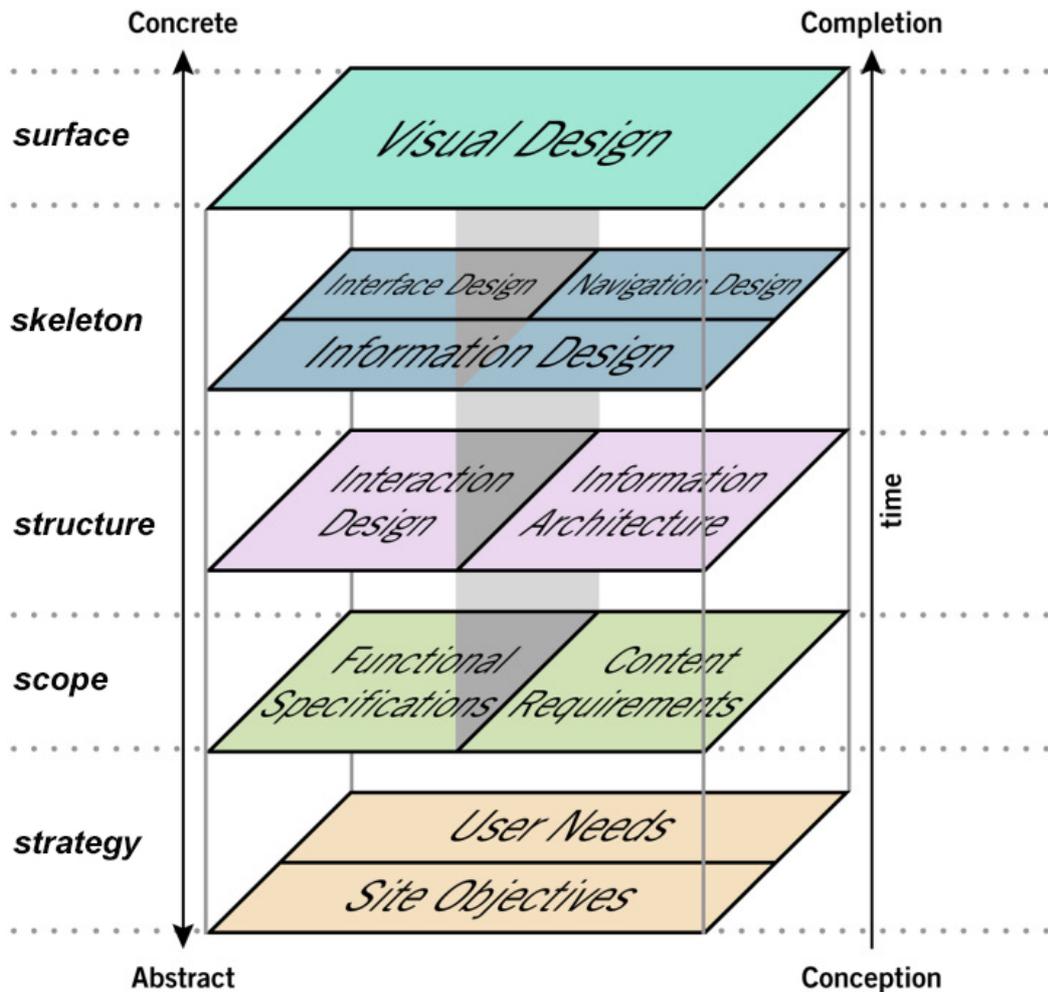


Figure 2. The elements of user experience model. Adapted from *The Elements of user experience: User-centered design for the web* (29), by J. J. Garrett, London: New Riders. Copyright [2002] by Jesse James Garrett.

Selected cases were extracted and analysed according to the elements of the user experience model. As shown in Figure 2, products are divided into five planes from conception to completion and from abstract to concrete. The analysis of the product and design guidance was completed through the extraction of the information for each plane.

The first plane of the model is the strategy, including user needs and product objectives.

The products that were welcomed by users need to meet the needs of users. If the strategic goals of the products can be achieved while satisfying the needs of users, users obtain a high-quality experience on the strategic plane of the product. The second plane is scope, which consists of content and functional requirements. On this plane, the functional composition of the product should meet the needs of the product content. The third plane is the structure, which is the information structure of the product. It is the user operation flow and the results of each operational step. The fourth plane is the skeleton. This plane of experience comes from the information design. The information design includes the interaction design and the navigation design. The interaction design includes the location of function icons and the area of each functional module. The navigation design guides the user to obtain the required information, and product navigation optimisation can improve the operating efficiency. The user experience at this level depends on whether the user can operate and understand the interface with high efficiency. The last plane is the surface layer, which is the experience that the interface conveys to users. Different elements in the interface can affect the user experience, including the location and size of images and the type of font.

4. Findings

This chapter presents the results of the case study. The current market for mindfulness apps can be understood through the objective interpretation of the research results, preparing for the next step - the discussion.

4.1 The iOS and Android market conditions for mindfulness apps

4.1.1 The iOS market conditions

Table 1

Mindfulness apps ranking in App Store

Ranking	Apps	Awards	Ranking in the category (Health & Fitness)
1	Mindfulness Daily	-	496
2	Headspace: Meditation	-	13
3	Calm	“2017 App of the Year” by Apple “Happiest App in the World” by Human Tech	5
4	The Mindfulness App	“Health & Fitness - Meditation & Mindfulness” May 2016 by Apple “10 Apps for Cooling Down” July 2016 by Apple	341
5	Simple Habit - Meditation	“New Apps We Love” May 2016 by Apple “Health & Fitness - Meditation & Mindfulness” May 2016 by Apple “10 Apps for Cooling Down” July 2016 by Apple	60
6	Aura: Calm Anxiety & Sleep	“Best of 2017” by Apple “#1 New Apps We Love” by Apple	131
7	Mindfulness Coach	-	523
8	Insight Timer	“Apps of the Year Winner” by TIME magazine	57
9	Relax Melodies	“Top Best Apps” by Amazon	52
10	Breethe - Meditation & Music	“Best New App” by Apple	34
11	10% Happier: Meditation	“#1 Top listed app” by New York Times ‘How to Meditate’ guide “New Apps We Love” by Apple	86
12	I Love Hue	-	362
13	3 Minute Mindfulness	-	1111
14	Memorado Brain Training Games	-	109
15	Relax Meditation	-	250

Note. Adapted from <https://www.qimai.cn/search/index/country/us/search/mindfulness>. Copyright (2018) by ASO100.

Table 1 indicates the ranking of mindfulness apps in iOS (Apple Operation System) Apple store. The top five mindfulness apps in the Apple store ranking were Mindfulness Daily, Headspace: Meditation, Calm, The Mindfulness App and Simple Habit - Meditation.

Among these apps, 345 received relevant awards, but the ranking of the five apps differed greatly in the health and fitness category. Only Calm and Headspace achieved relatively high rankings. The top five ranking apps in the health and fitness category were Calm (5th), followed by Headspace (13th), Breethe – Meditation & Music (34th), Relax Melodies (52nd) and Insight Timer (57th).

Table 2

Mindfulness apps ratings in App Store

Ranking	Apps	Rating Score (out of 5.0)	Ratings
1	Mindfulness Daily	4.7	3800
2	Headspace: Meditation	4.9	271788
3	Calm	4.8	122138
4	The Mindfulness App	4.6	1294
5	Simple Habit - Meditation	4.8	27509
6	Aura: Calm Anxiety & Sleep	4.8	4068
7	Mindfulness Coach	3.3	22
8	Insight Timer	4.8	23023
9	Relax Melodies	4.7	184311
10	Breethe - Meditation & Music	4.8	7623
11	10% Happier: Meditation	4.8	18913
12	I Love Hue	4.8	7845
13	3 Minute Mindfulness	4.6	675
14	Memorado Brain Training Games	4.7	7011
15	Relax Meditation	4.7	30457

Note. Adapted from <https://www.qimai.cn/search/index/country/us/search/mindfulness>. Copyright (2018) by ASO100.

Table 2 illustrates the satisfaction score and popularity of the top 15 apps in the Apple store. The Rating Score in Table 2 shows the level of satisfaction, and the Ratings shows the number of an app being evaluated, which could reflect the popularity of an app. In the top five apps in Table 2, three apps were also the top three Rating Score and Ratings. They were Headspace (4.9 rating score with 271788 ratings), Calm (4.8 rating score with 122138 ratings), and Simple Habit (4.8 rating score with 27509 ratings). In the top five apps, there were two apps with low scores and ratings. One was Mindfulness Daily. Its score was 4.7, 3800 ratings. The other was The Mindfulness App. Its score was 4.6 with only 1294 ratings. In the sixth to 15th places, Insight Timer, Relax Melodies and Relax Meditation received many comments.

4.1.2 The Android market conditions

Table 3

Mindfulness apps rankings in Google Play

Ranking	Apps	Awards	Installs
1	Headspace	“Editors’ Choice” - Google Play	5,000,000
2	The Mindfulness App	“Editors’ Choice” - Google Play	500,000+
3	Calm	“Editors’ Choice” - Google Play	5,000,000
4	Meditation & Relaxation: Guided Meditation	-	500,000+
5	Mindfulness: Guided Meditation for Stress, Anxiety	-	100,000+
6	Stop Breathe & Think: Meditate	“Editors’ Choice” - Google Play	1,000,000
7	Aware - Meditation & Mindfulness	-	100,000+
8	Smiling Mind	-	100,000+
9	Chill - daily mindfulness	-	10,000+
10	Insight Timer	“Editors’ Choice” - Google Play	1,000,000
11	1000 Guided Meditation	-	100,000+
12	MindBell	-	500,000+
13	Mindfulness - Lugn och lycklig	-	10,000+
14	Mindfulness Coach	-	1,000+
15	Mindfulness	-	1,000+

Note. Adapted from <https://play.google.com/store/search?q=mindfulness&c=apps>. Copyright (2018) by Google Play.

From Table 3 the rankings of mindfulness apps in Google Play running in the Android operation system can be seen. The Awards column in Table 3 indicates that an app has been approved and recommended by the Google Play editor, and Installs represents the number of times an app is installed. As Table 3 shows, in the top 10 apps, four apps obtained the award, and the number of installs had reached one million or more for those

apps. They were Headspace, Calm, Stop Breathe & Think, and Insight Timer. Although The Mindfulness App ranked second and received an award, it was installed by only about half a million. After the 10th place apps, the number of installs was relatively low, and they did not receive awards.

Table 4

Mindfulness apps ratings in Google Play

Ranking	Apps	Rating Score (out of 5.0)	Ratings
1	Headspace	4.6	71522
2	The Mindfulness App	4.3	5548
3	Calm	4.6	97591
4	Meditation & Relaxation: Guided Meditation	4.8	22107
5	Mindfulness: Guided Meditation for Stress, Anxiety	4.5	370
6	Stop Breathe & Think: Meditate	4.3	8125
7	Aware - Meditation & Mindfulness	4.7	3963
8	Smiling Mind	3.8	1650
9	Chill - daily mindfulness	4.7	763
10	Insight Timer	4.6	18379
11	1000 Guided Meditation	4.6	1405
12	MindBell	4.4	4571
13	Mindfulness - Lugn och lycklig	4.4	101
14	Mindfulness Coach	4.6	41
15	Mindfulness	4.6	5

Note. Adapted from <https://play.google.com/store/search?q=mindfulness&c=apps>. Copyright (2018) by Google Play.

Table 4 shows the user satisfaction and popularity of mindfulness apps in Google Play. In the top ten apps, four apps had more than 1000 ratings. They were Calm with 97591 ratings, Headspace with 71522 ratings, Meditation & Relaxation with 22107 ratings, and Insight Timer with 18397 ratings. Their rating score was at least 4.6. The ratings for apps after the 10th place were relatively low, with fewer than 5000.

4.1.3 Summary of the four tables

For iOS, the statistics of five apps were better than other apps. They were Headspace, Calm, Simple Habit, Insight Timer and Relax Melodies. They also satisfied four conditions. The first condition was that they were ranked in the top 10 search results for mindfulness apps. The second condition was that these apps ranked in the top 60 among all apps in the related category of health and fitness. The third condition was that the rating score reached at least 4.7 (out of 5.0). The last condition was that the number of ratings was more than 50,000.

In the Android operation system, the statistical results of three apps were better than the other apps. They were Headspace, Calm and Insight Timer. They also satisfied four conditions. The first condition was that they were ranked in the top 10 search results for mindfulness apps. The second condition was that they obtained an award. The third condition was that there were more than one million installations. The last condition was that the rating score reached 4.6 (out of 5.0), and the number of ratings exceeded 10,000.

In general, the three apps with better statistical results than other apps in the Android operation system were Headspace, Clam and Insight Timer. These three apps also appeared in the five statistically best results in iOS. Therefore, these three selected apps had good statistical results in both the iOS and Android operating systems. Two of the five best-performing mindfulness apps in the iOS did not appear in the three selected apps with better statistical results than the other Android mindfulness apps. They were Simple

Habit and Relax Melodies. By comparing the data of the two apps in Google Play, the results show that the rating score of Simple Habit was 4.7, but the number of ratings was only 7879 (Google Play, 2018), which did not meet the conditions for the three best apps in the Android system. Relax Melodies scored 4.5, and the number of ratings was 217218 (Google Play, 2018), which was far higher than Calm, which had the most number of ratings (97591) in the Android statistical results, indicating that the popularity of Relax Melodies was relatively high. Therefore, Relax Melodies could be used as a supplement to the three selected mindfulness apps in the iOS and Android systems to continue the research and improve the objectivity of the study.

After comparing the data of the iOS apps and the Android apps, the sections that follow will present detailed statistics and analysis of the four apps using the elements of the user experience model mentioned in the methodology chapter. The four apps are Calm, Headspace, Insight Timer and Relax Melodies.

4.2 Introduction to the four selected apps

According to the user experience model theory mentioned in the previous chapter, the following sections contain the data needed for the discussion. The four apps and the five experience planes of the four apps are introduced.

4.2.1 Calm



Figure 3. Introduction interfaces of Calm. Reprinted from *ASO100*, by Calm, n.d., Retrieved April 13, from <https://www.qimai.cn/app/baseinfo/appid/571800810/country/us>. Copyright 2018 by ASO100. Reprinted with permission.

Calm was released in 2013, and its main function is to provide online mindfulness sessions. As shown in Figure 3, the app is characterised by the use of a lot of natural landscape images to convey the natural feeling to users. According to the previous statistics (Table 1), Calm won the "2017 App of the Year" award from Apple and the "Happiest App in the World" from Human Tech. Calm was ranked fifth in the health and

fitness category, and it was popular with users in both iOS and Android operating systems.

4.2.2 Headspace

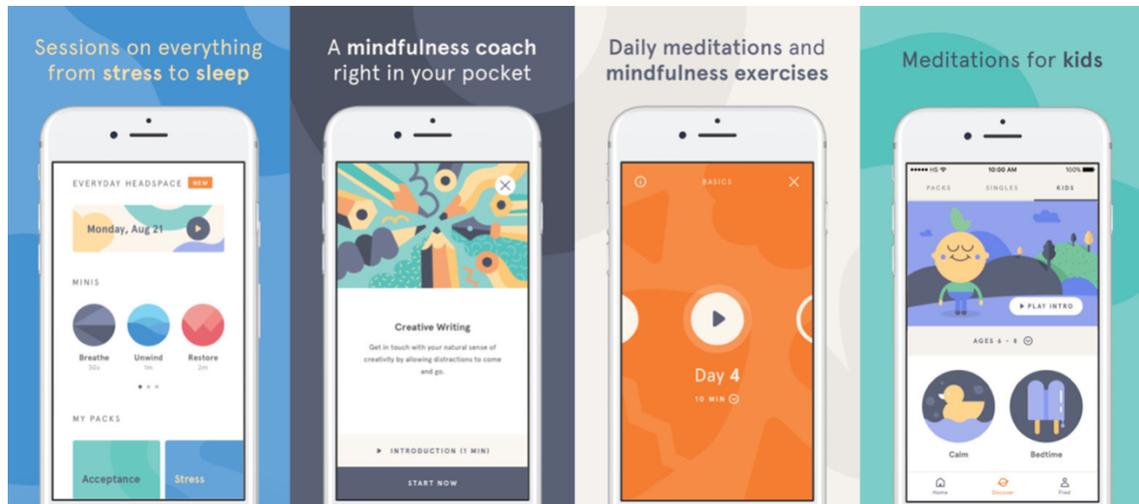


Figure 4. Introduction interfaces of Headspace. Reprinted from *ASO100*, by Headspace, n.d., Retrieved April 13, from <https://www.qimai.cn/app/baseinfo/appid/493145008/country/us>. Copyright 2018 by ASO100. Reprinted with permission.

Headspace was released in 2012. Figure 4 shows the introduction pages of the app. Many features in the Headspace app are represented by illustrations, and humorous illustrations are used to guide users to conduct the online mindfulness courses. The app also has mindfulness content designed for children, and it is easier to attract children to learn mindfulness with illustrations.

4.2.3 Insight Timer

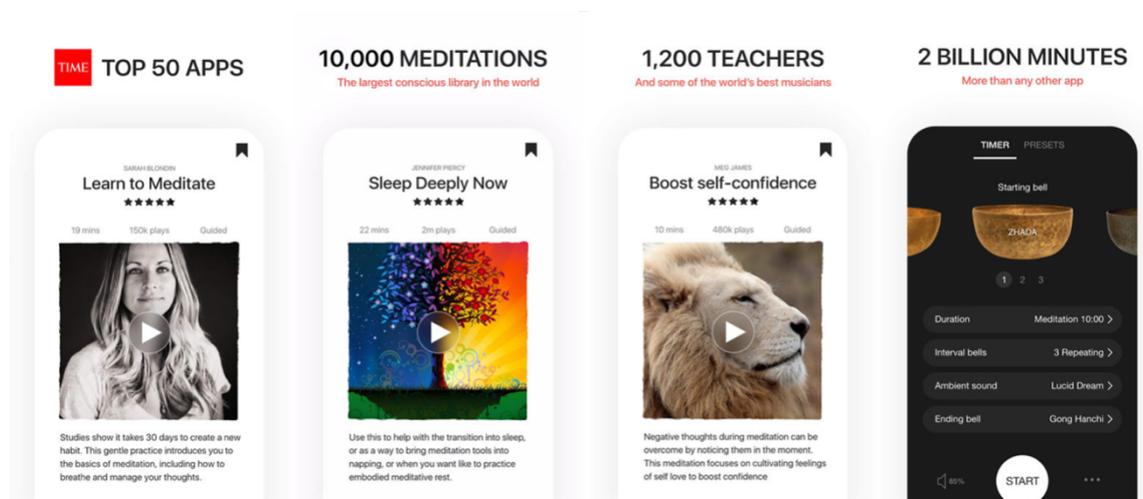


Figure 5. Introduction interfaces of Insight Timer. Reprinted from *ASO100*, by Insight Timer, n.d., Retrieved April 13, from <https://www.qimai.cn/app/baseinfo/appid/337472899/country/us>. Copyright 2018 by ASO100. Reprinted with permission.

I Insight Timer was released in 2014. Although the app was released late relative to the three other selected apps, its content is more extensive. From its introduction page (Figure 5), it can be seen that it is a mindfulness learning platform, providing more than 10,000 learning courses. Another feature is that a lot of different mindfulness timers are provided to users for a personalised experience.

4.2.4 Relax Melodies

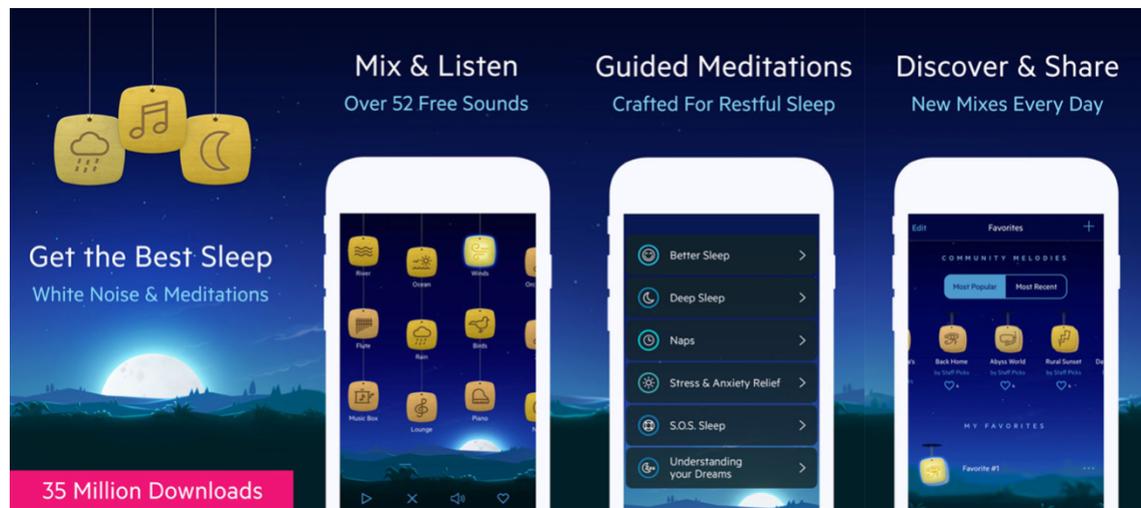


Figure 6. Introduction interfaces of relax melodies. Reprinted from *ASO100*, by Relax Melodies, n.d., Retrieved April 13, from <https://www.qimai.cn/app/baseinfo/appid/314498713/country/us>. Copyright 2018 by ASO100. Reprinted with permission.

Relax Melodies was released in 2009, and its main function is to help users sleep using many relaxing sound options. Compared to the other three selected apps, it is characterised by the ability to mix sounds, and over 50 sounds are offered to users. As Figure 6 shows, the interface background of the app matches the content of the primary function (sleep), with the night sky and moonlight as the background, but fewer online mindfulness courses are provided.

4.3 The strategy plane for the four apps

According to the research method mentioned earlier, the strategy plane is the first level of the product in the development from abstract to concrete. It includes the product objectives and user needs. The following content extracts information about these two aspects. In the process of achieving the product objectives, if the requirements of users are satisfied, the likelihood of the product being welcomed by users may increase. The product meets user needs through its functions, and the next plane, scope, explains the specific functions of the four apps.

4.3.1 The strategy plane of Calm

Product objectives: To earn profits by upgrading users from a free account to a premium account. Free accounts can only try part of the content, and premium accounts can unlock the entire course content.

User needs: Calm meets the needs of online mindfulness training for users. The natural landscape images and background music in Calm make the user experience different to other apps.

4.3.2 Headspace

Product objectives: To guide the user to practice mindfulness through its featured illustrations. After the user completes the basic course, they need to pay to be able to learn the entire course and the product was profitable.

User needs: Headspace satisfies user needs for online learning of mindfulness, and the illustrations on this app give the user a different experience compared to other similar products.

4.3.3 Insight Timer

Product objectives: To attract a large number of users by covering a wide range of content and building a platform for user communication and learning. Users need to pay to unlock all timer functions.

User needs: Insight Timer not only provides users with free mindfulness courses but also has a social function, which means users can communicate with other users. The needs of learning and social could be met to promote growth in the number of users of this product, which is conducive to achieving the product goals.

4.3.4 Relax Melodies

Product objectives: To encourage free accounts to become premium accounts by

providing users with the right to use most of the background music and removing advertisements embedded in the app when providing full-service content.

User needs: Relax Melodies satisfies the need of users to improve their quality of sleep, guiding sleep through the use of background music. Users can also obtain a personalised experience by mixing sounds according to their personal preferences.

4.4 The scope plane of the four apps

According to the research method mentioned in the previous chapter, the scope plane is composed of functional specifications and content requirements. On this plane, the objectives of the strategy plane for the product are completed through the functional settings. The following content includes a function comparison between the four apps and the difference between similar functions in the four apps.

4.4.1 Function comparison

Table 5

Function comparison between the four apps

Functions		Calm	Headspace	Insight Timer	RelaxMelodies	
Online classes	my favourite	✓	✓	✓	☐	
	share	☐	☐	✓	☐	
	beginners	✓	✓	✓	☐	
	kids	✓	✓	✓	☐	
	students	☐	✓	☐	☐	
	health	✓	✓	✓	☐	
	stress	✓	✓	✓	☐	
	sleep	✓	✓	✓	☐	
	personal growth	✓	✓	✓	☐	
	happiness	✓	✓	✓	☐	
	relationship	✓	✓	✓	☐	
	spiritual	✓	✓	✓	☐	
	sports	☐	✓	☐	☐	
	search	☐	☐	✓	☐	
	Sounds	sleep stories	✓	☐	✓	☐
		sleep music	✓	☐	✓	✓
relax music		✓	☐	✓	✓	
nature melodies		✓	☐	✓	✓	
focus		✓	☐	✓	✓	
DIY sounds		☐	☐	☐	✓	
talks		☐	☐	✓	☐	
Timer	ending reminder	✓	☐	✓	✓	
	sounds choices	☐	☐	✓	☐	
Community	join communities	☐	☐	✓	☐	
	join groups	☐	☐	✓	☐	
	add friends	☐	☐	✓	☐	
	messages	☐	☐	✓	☐	
Profile	statistics	✓	✓	✓	☐	
	session history	✓	✓	✓	☐	
	settings	✓	✓	✓	✓	
	invite friends	✓	✓	✓	✓	
	reminder	✓	✓	✓	☐	
	clear downloads	☐	✓	✓	☐	
	help center	✓	✓	✓	✓	
Other	get sleep mist	✓	☐	☐	☐	
	Apple Health	✓	✓	✓	✓	
	news	☐	☐	☐	✓	
	advertisement	☐	☐	☐	✓	

Note. Adapted from <https://www.qimai.cn/search/index/country/us/search/mindfulness>.
Copyright (2018) by ASO100.

The function statistics of the four apps in Table 5 show that the functions of Insight Timer are relatively comprehensive. Insight Timer includes the five basic functions of (1) online mindfulness classes, (2) sounds, (3) timer, (4) community, and (5) profile. The other four apps focus on different functions. Calm concentrates on online classes and sound functions; Headspace focuses on online classes, and Relax Melodies focuses on sound functions. Insight Timer has community features that the other products do not have. Relax Melodies only provides a small number of sleep lessons.

4.4.2 Comparison of similar functions in the four apps

This section shows the different designs for the same functions in the four selected apps.

4.4.2.1 The online mindfulness session function

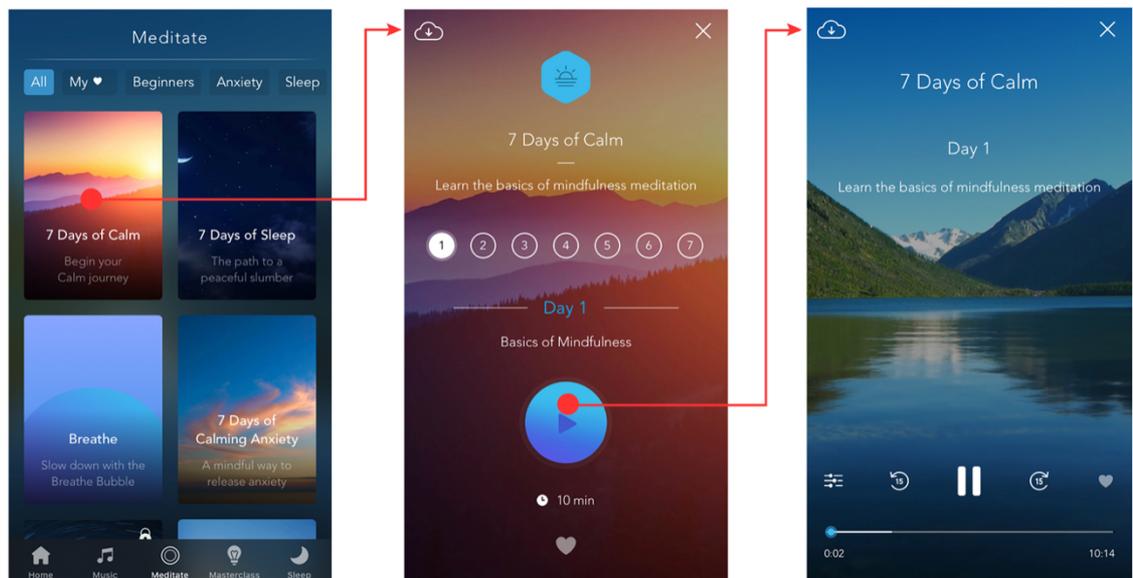


Figure 7. Calm online mindfulness session. From Calm (Version 3.15.1). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Calm.

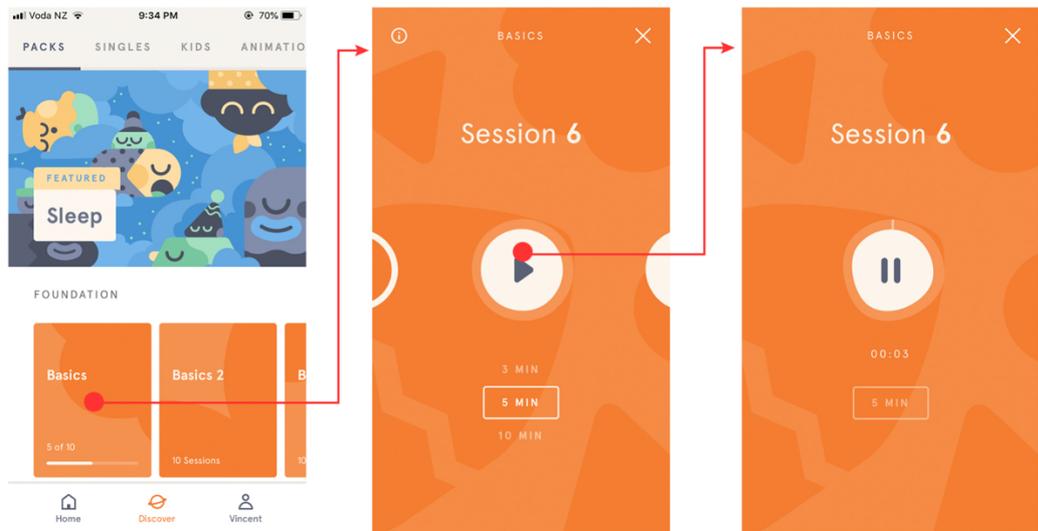


Figure 8. Headspace online mindfulness session. From Headspace (Version 3.21.0). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Headspace.

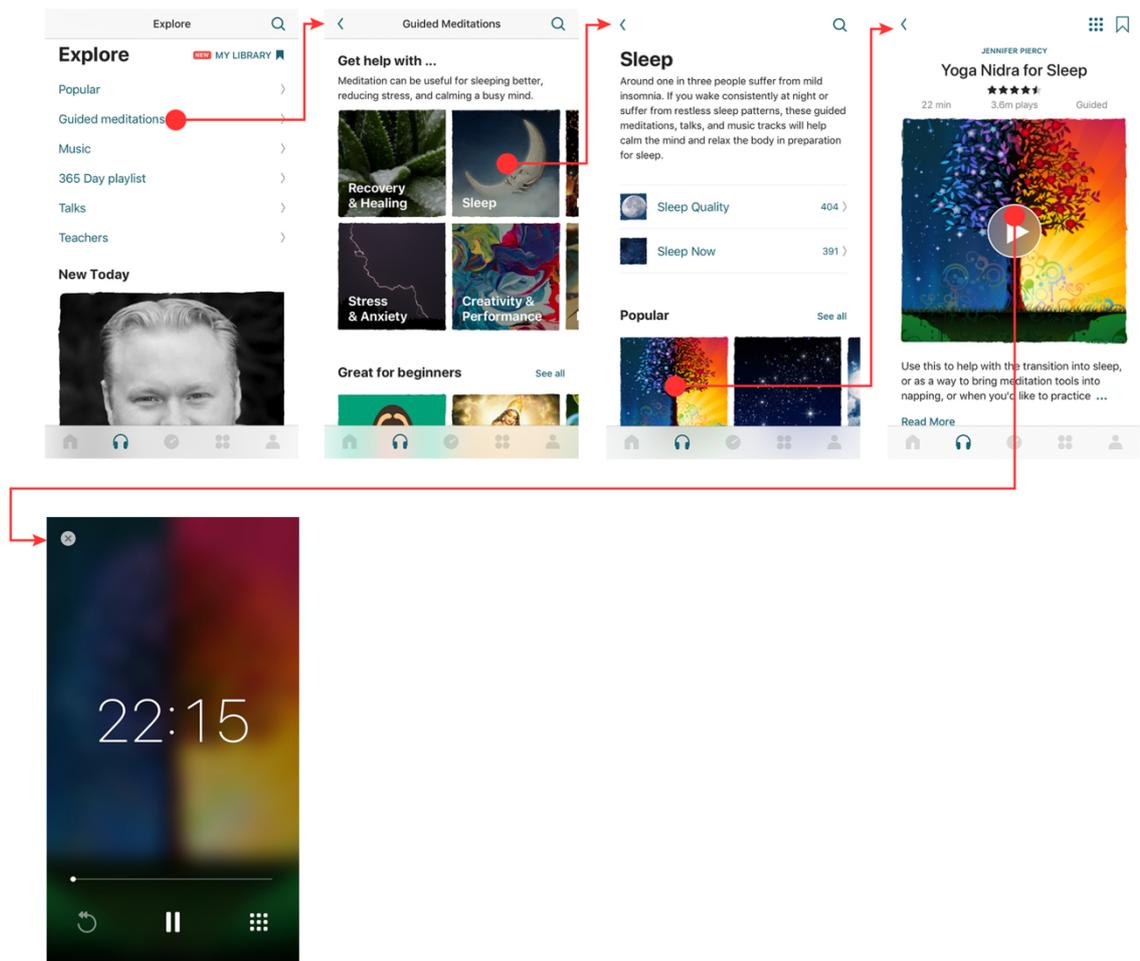


Figure 9. Insight Timer online mindfulness session. From Insight Timer (Version 12.2.32). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Insight Timer.

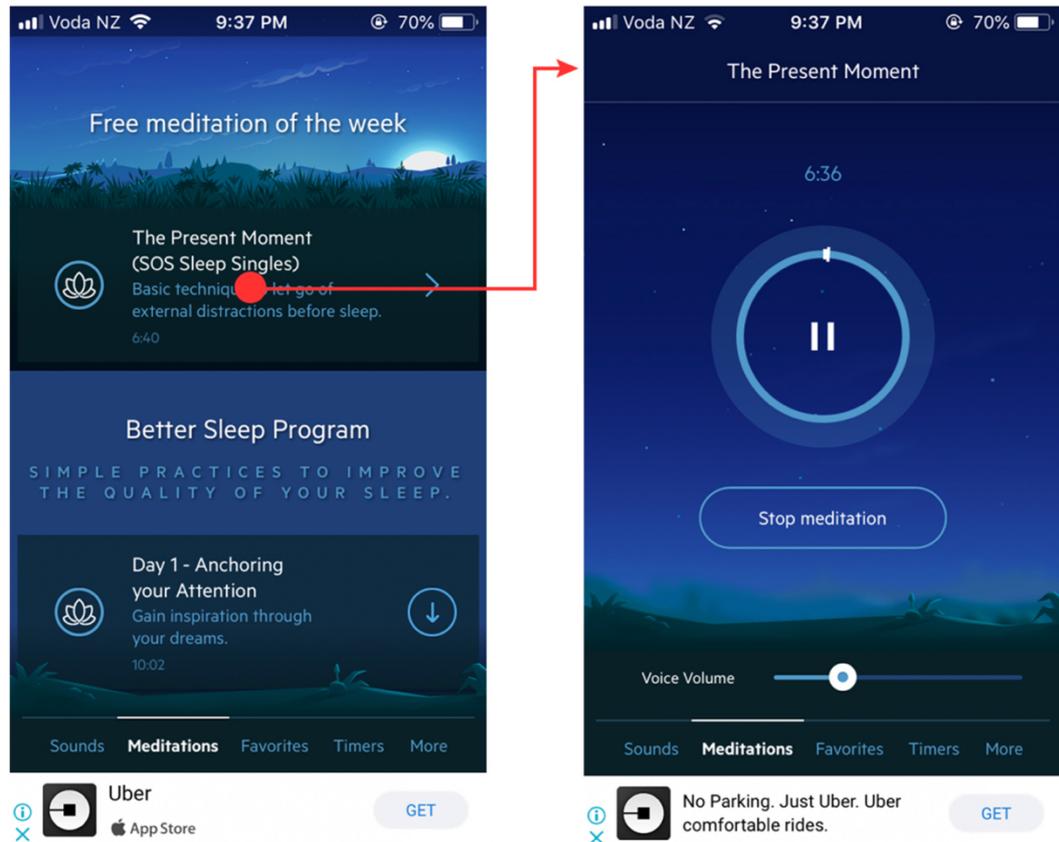


Figure 10. Relax Melodies online mindfulness session. From Relax Melodies (Version 6.2). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Relax Melodies.

The function buttons for these four products are set in the tab bar at the bottom of the screen. Calm (Figure 7) and Headspace (Figure 8) use a card design on the user interface to display function options, which means that the function information is arranged in clickable card-shaped buttons. Insight Timer (Figure 9) uses a combination of lists and cards, and Relax Melodies uses a list design to display its functions.

There are three operational steps from course selection to final content playback in Calm and Headspace, and five operational steps in Insight Timer. There are only two steps in Relax Melodies. Compared to the other three apps, Relax Melodies (Figure 10) lacks a

click-to-play page. Therefore, when the course button is clicked, the interface moves directly to the play page. Insight Timer has the highest number of operations because it includes more content than the other three apps, and it also offers sub-categories which can be chosen after a category is selected. There are more detailed designs on the click-to-play page, such as the functions of Favourites, Ratings and Times.

4.4.2.2 The music function

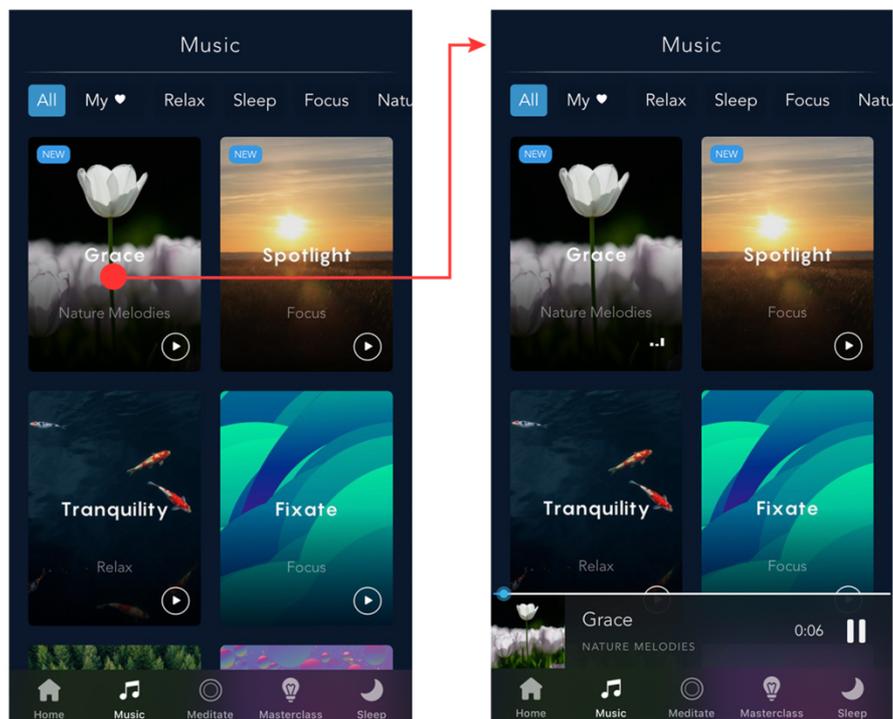


Figure 11. The Calm music function. From Calm (Version 3.15.1). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Calm.

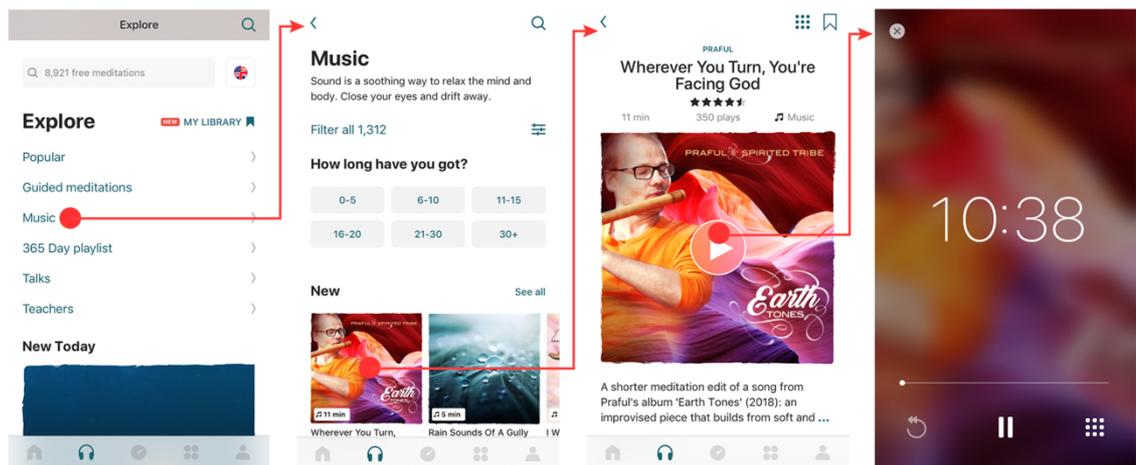


Figure 12. The Insight Timer music function. From Insight Timer (Version 12.2.32). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Insight Timer.

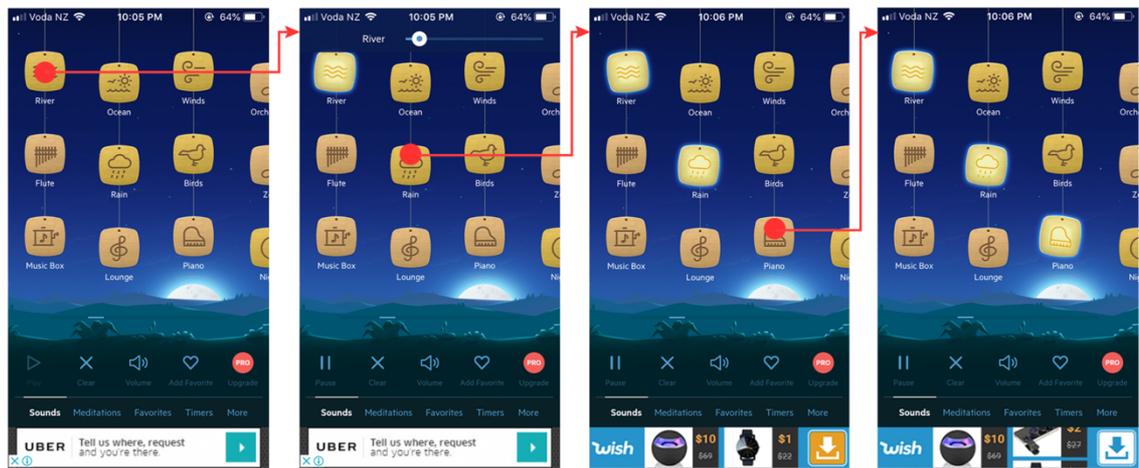


Figure 13. The Relax melodies music function. From Relax Melodies (Version 6.2). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Relax Melodies.

The music function was is of the main functions of Calm, Insight Timer and Relax Melodies. The Music button is placed in the tab bar at the bottom of the apps, especially Relax Melodies, which has the Sound button in the first position on the tab bar. But Headspace does not offer a music service.

As shown in Figure 11, the music function of Calm is simple to operate. There are only two steps. After the user clicks the card displaying the music name, the music plays automatically. The player interface is displayed below the selected music page, and no new page is displayed. When selecting music in Insight Timer (Figure 12), a detailed classification and description of the music is given, including the length of the music. This detail is a feature that the other apps do not have. The music function of Relax Melodies (Figure 13) is different from the other three apps. This function is named Sounds. In the Sounds interface, the user clicks buttons to play the music, and clicks on different buttons to mix all the selected music to create the preferred sound.

4.4.2.3 The timer function

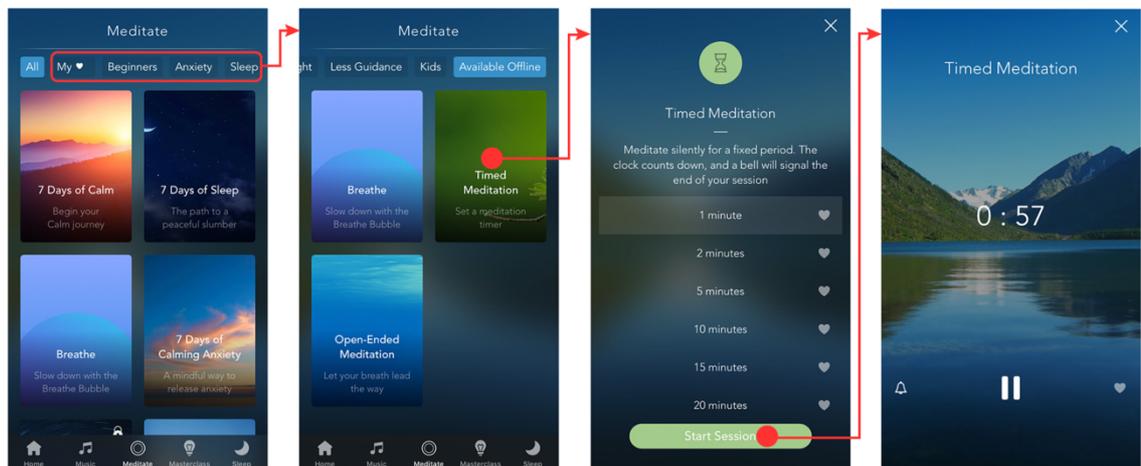


Figure 14. The Calm timer function. From Calm (Version 3.15.1). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Calm.

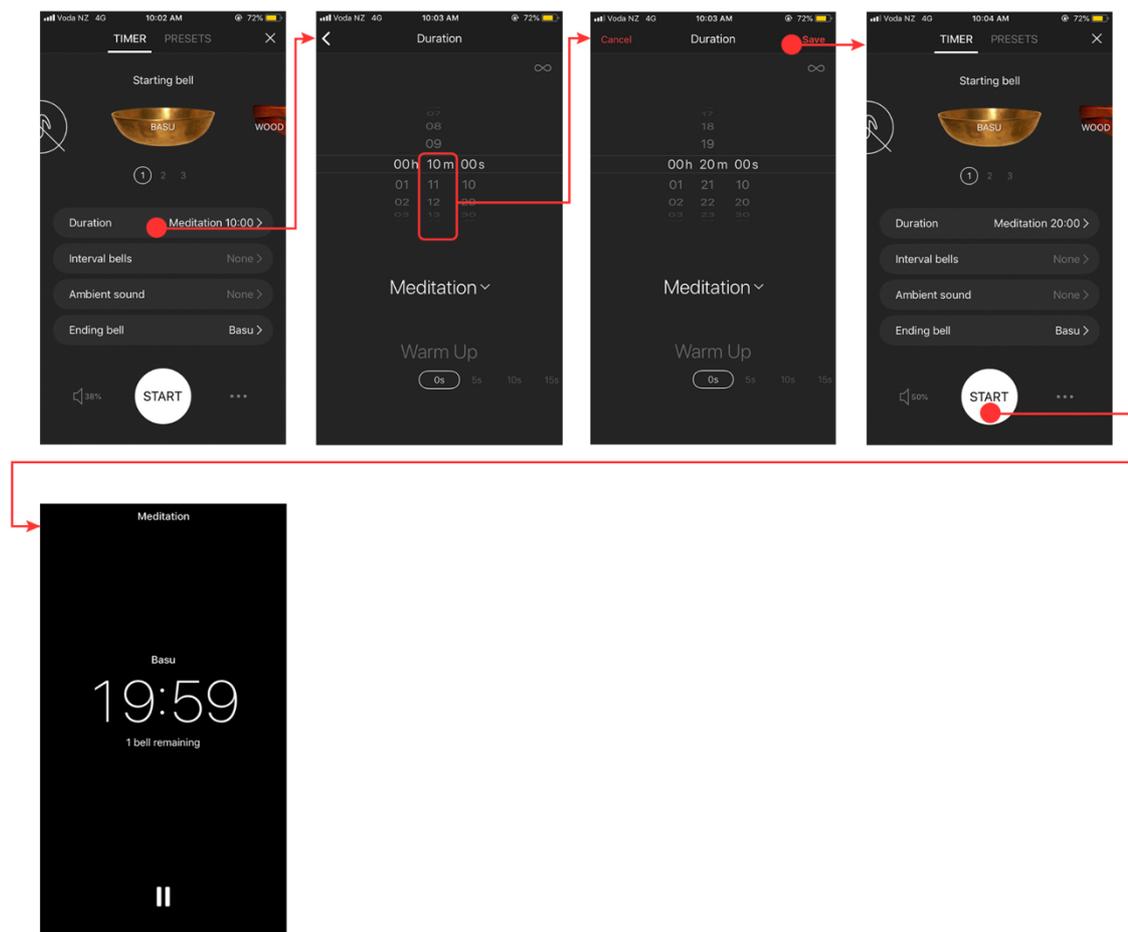


Figure 15. The setting process for the timer. From Insight Timer (Version 12.2.32). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Insight Timer.

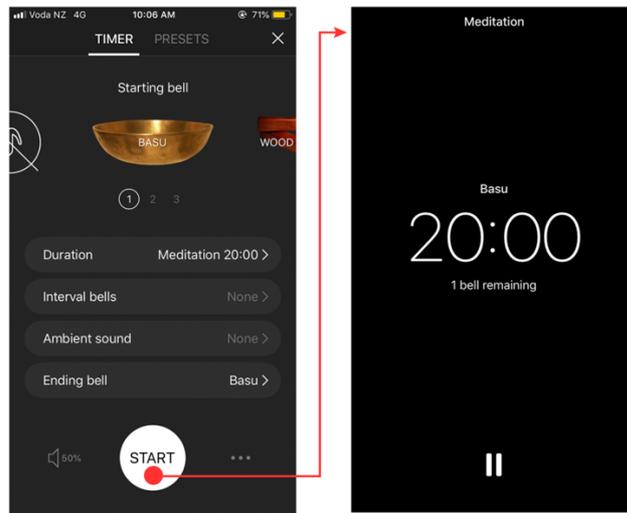


Figure 16. The Insight Timer timer function. From Insight Timer (Version 12.2.32). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Insight Timer.

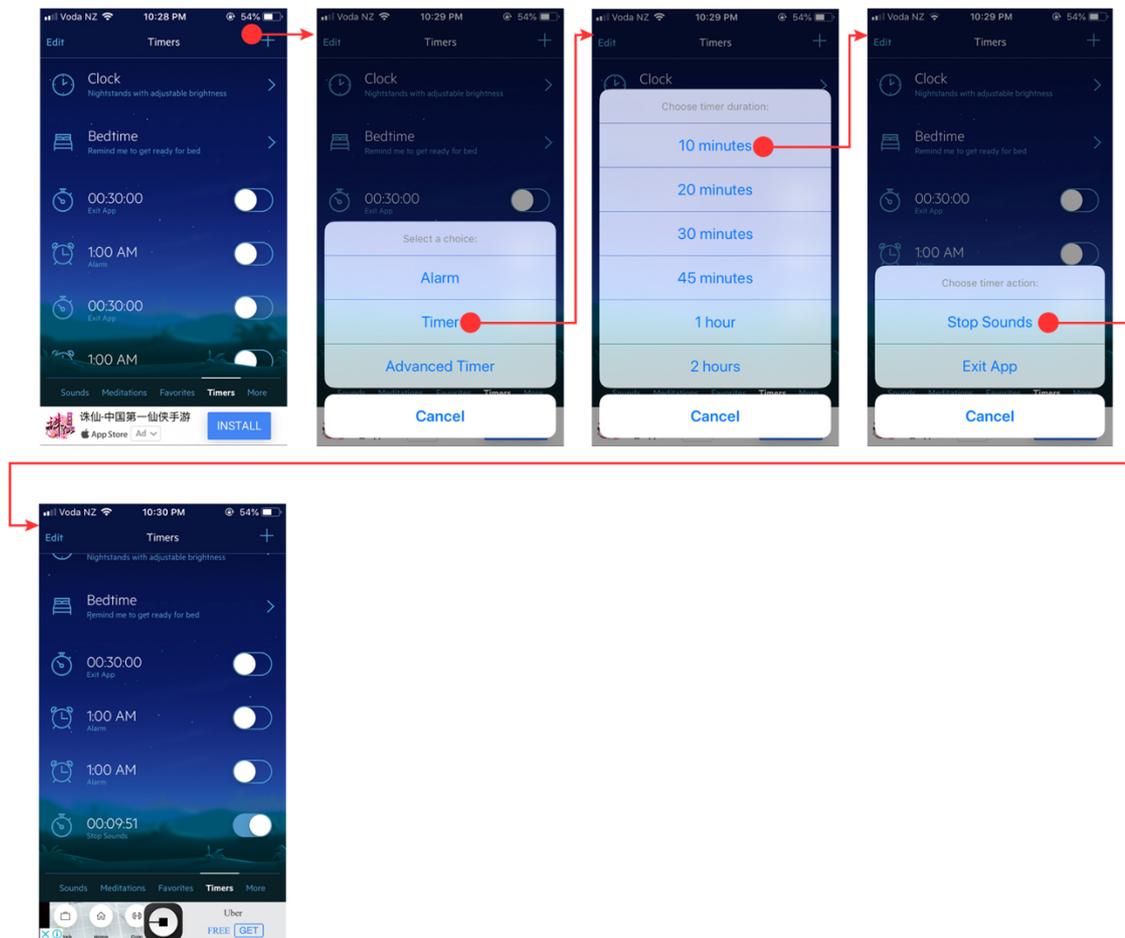


Figure 17. The Relax Melodies timer function. From Relax Melodies (Version 6.2). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Relax Melodies.

As shown in figures 16 and 17, the timer buttons are placed on the tab bar at the bottom of the page as one of the main functions in Insight Timer and Relax Melodies. The timer function is considered to be a secondary function in Calm, as Figure 14 shows. The timer in Calm is placed in the last position in the top menu bar. In Insight Timer, the timer is placed in the middle of the bottom tab bar as an important function. A lot of detailed setting functions have been added for users, including a starting bell, ending bell, duration, and ambient sound. There are five steps from setting the timer to starting the timer in Insight Timer. However, the settings can be saved, and if users use the same setting next time, the saved timer starts after tapping one button (Figure 16). The timer function in Relax Melodies also requires five steps, but many default timers are displayed on the interface (Figure 17). After the setting is added, the interface becomes more complicated.

4.4.2.4 The community function

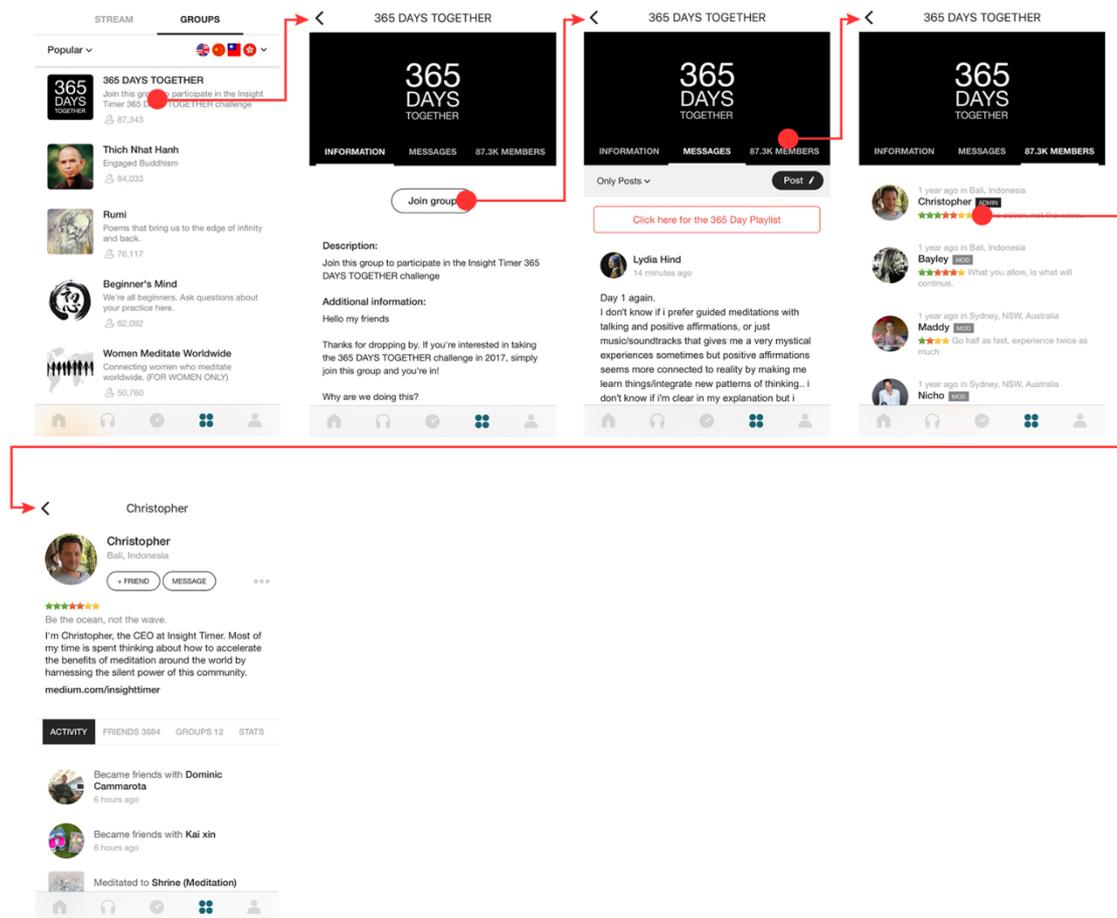


Figure 18. The Insight Timer community function. From Insight Timer (Version 12.2.32). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Insight Timer.

Among the four selected apps, Insight Timer is the only one with a social function. Users can join different groups, communicate with members of the group, and add members as friends. As Figure 18 shows, from finding a group to adding a friend, five steps are required. The social function is placed in the tab bar at the bottom of the app as one of the five most important functions. Users can find groups based on different categories.

4.4.2.5 The profile function

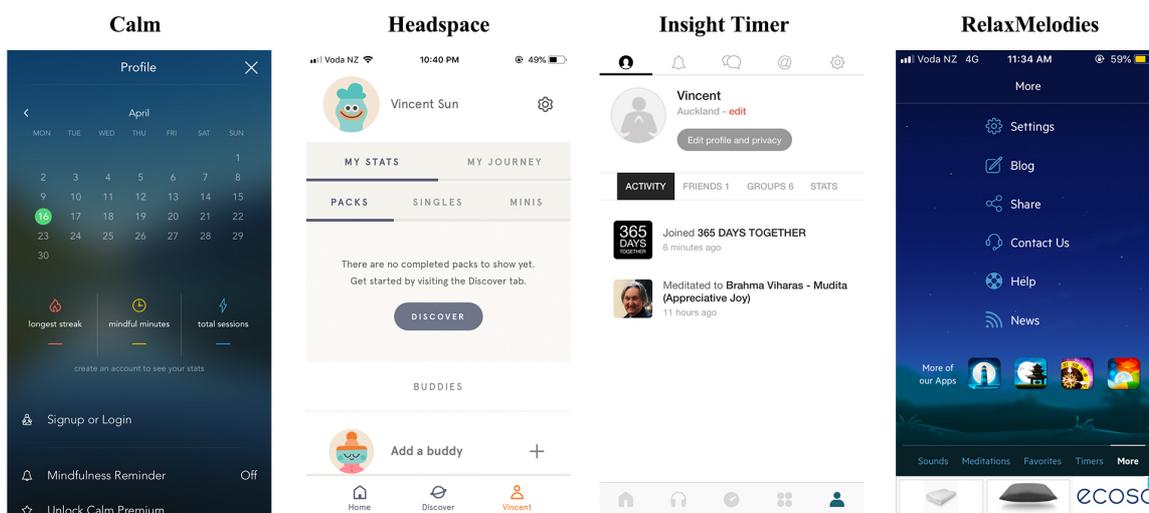


Figure 19. Comparison of the profile pages of the four apps. From Calm (Version 3.15.1), Headspace (Version 3.21.0), Insight Timer (Version 12.2.32), Relax Melodies (Version 6.2). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Calm, Headspace, Insight Timer, Relax Melodies.

Figure 19 compares the profile pages of the four apps. Calm, Headspace, and Insight Timer display statistics on the profile page. Relax Melodies does not support the recording of personal data. The profile page of Calm is characterised by a calendar function that allows users to view daily records. A feature of Headspace is that recorded information can be classified. There is also an invitation button at the bottom of the profile interface so other users can be invited to use this app. Insight Timer has categories at the top of the profile page, especially for the messaging function. There is no data on the profile page for Relax Melodies. There are some developer advertisements on the page, including about sharing the app, news and other apps from their company.

4.5 The structure plane of the four apps

According to the research method mentioned in the previous chapter, the structure plane is composed of the information architecture and interaction design. On this plane, the product satisfies the requirements of the scope layer of function and content through the design of the product structure and interaction flow. The following content describes the structure and interaction flow of the four apps.

4.5.1 Information architecture



Figure 20. The content structure of Calm. From Calm (Version 3.15.1). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Calm.

Figure 20 shows the content structure of Calm. Its structure includes five functions. The structure of Calm is characterised by the average proportion of the contents of each part, and only the content of the Masterclass is small. Regarding interaction design, sub-menus are set under most of the main menus of the app. Users generally need to go through two operations to find the required information.

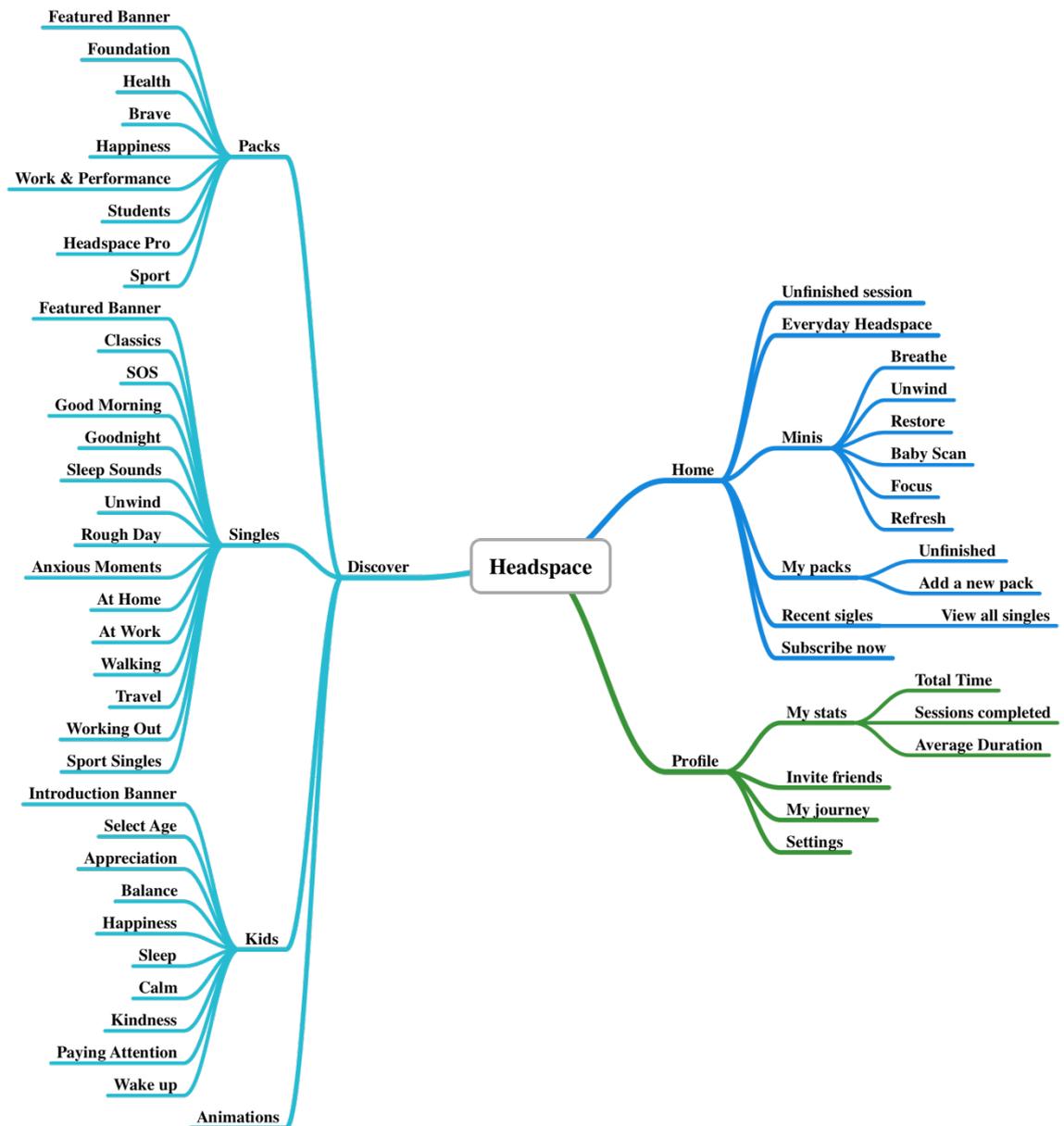


Figure 21. The content structure of Headspace. From Headspace (Version 3.21.0). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Headspace.

As shown in Figure 21, the Discover menu has the largest proportion of content structure in Headspace. In this module, the courses relating to online practice are arranged in two planes of sub-menus. Under normal circumstances, the user needs three operations to find the specific information about a course.

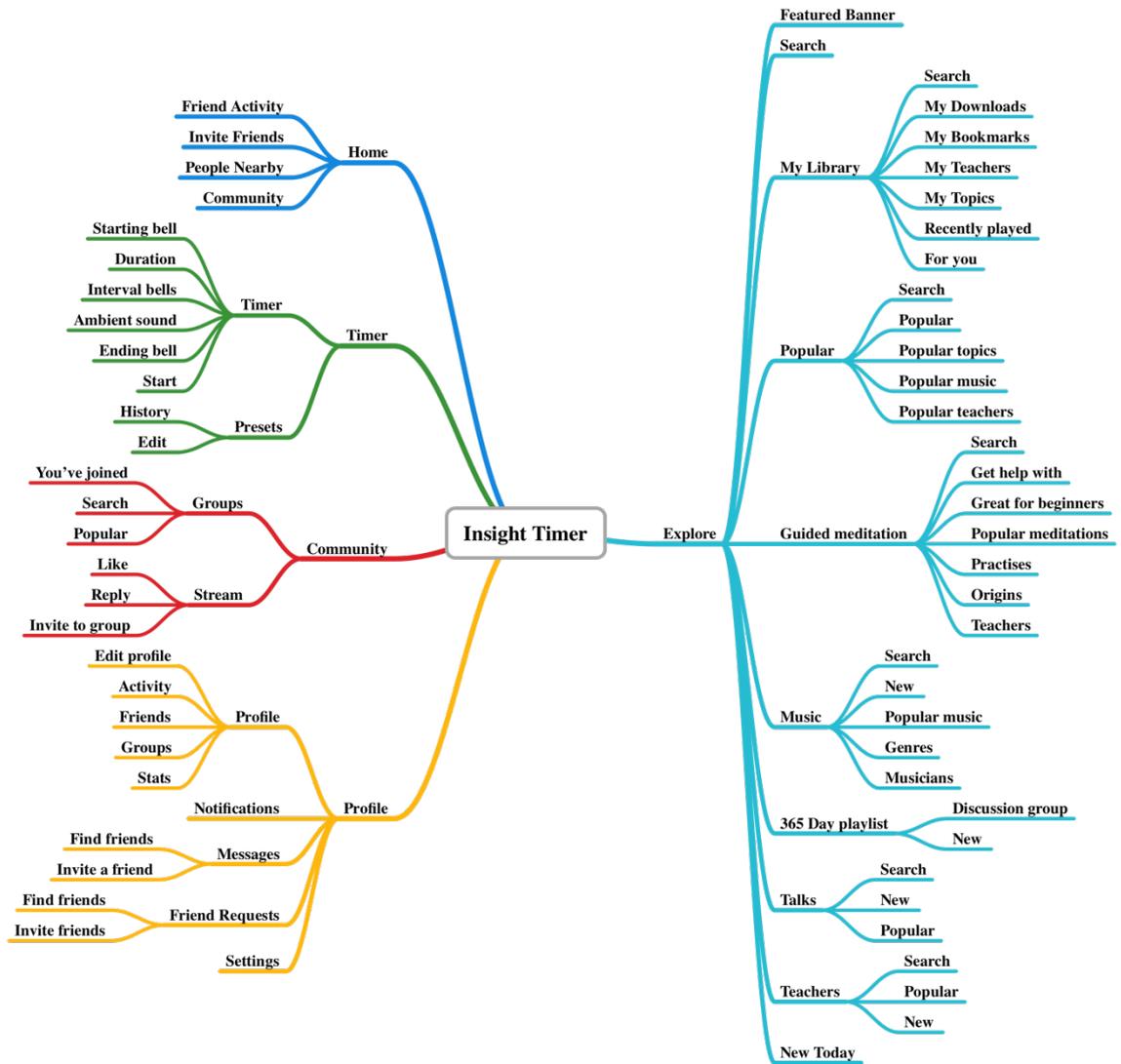


Figure 22. The content structure of Insight Timer. From Insight Timer (Version 12.2.32). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Insight Timer.

Figure 22 shows the content structure of Insight Timer. The structure is characterised by the main menu Discovery containing many items, and there are also many sub-menus. The other menu also included two sub-menus. The overall content range is more extensive than the other three apps.

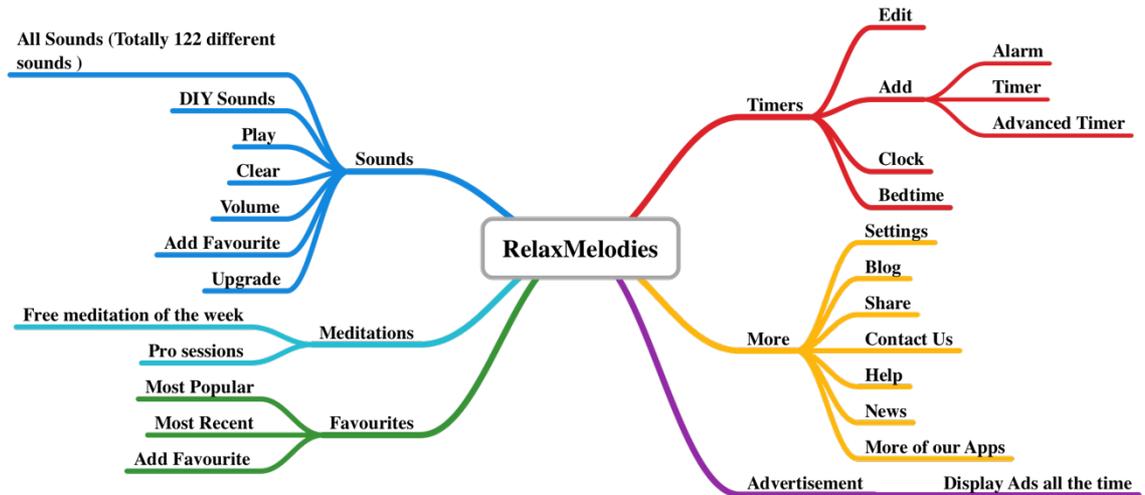


Figure 23. The content structure of Relax Melodies. From Relax Melodies (Version 6.2). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Relax Melodies.

As shown in Figure 23, the content structure of Relax Melodies features less content, fewer sub-menus, and a simpler structure. Advertisements display on all pages and disappear when users upgrade their account.

4.5.2 Interaction design

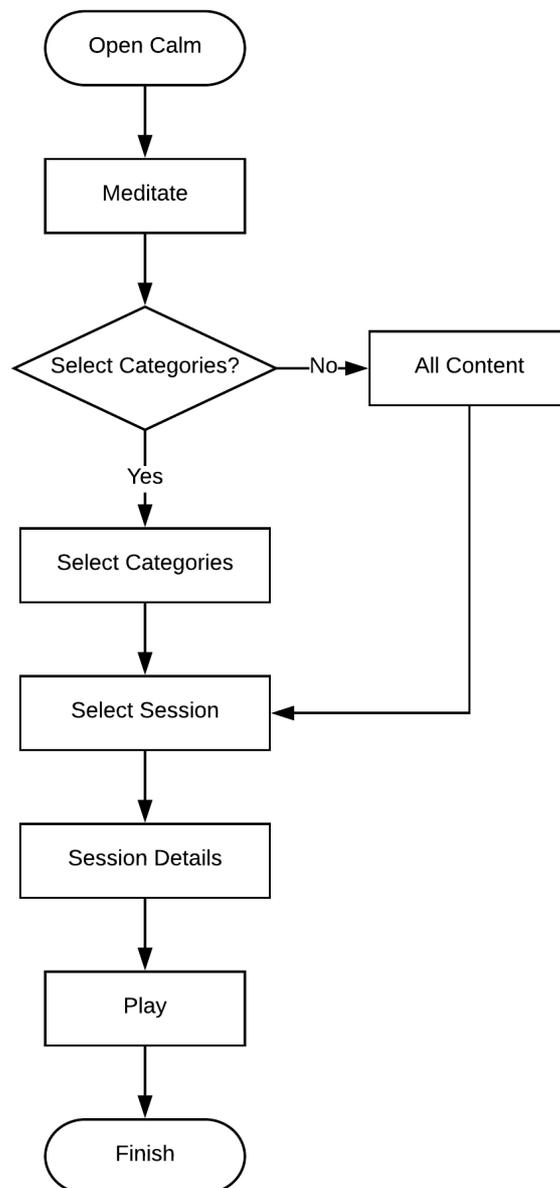


Figure 24. The process of playing a session in Calm. From Calm (Version 3.15.1). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Calm.

Figure 24 shows the interactive process from opening Calm to playing a session, including one decision in the process. The interaction process for Calm is different to the three other apps in that, after the session is selected, detailed information about the session will display, and then the play button can be clicked.

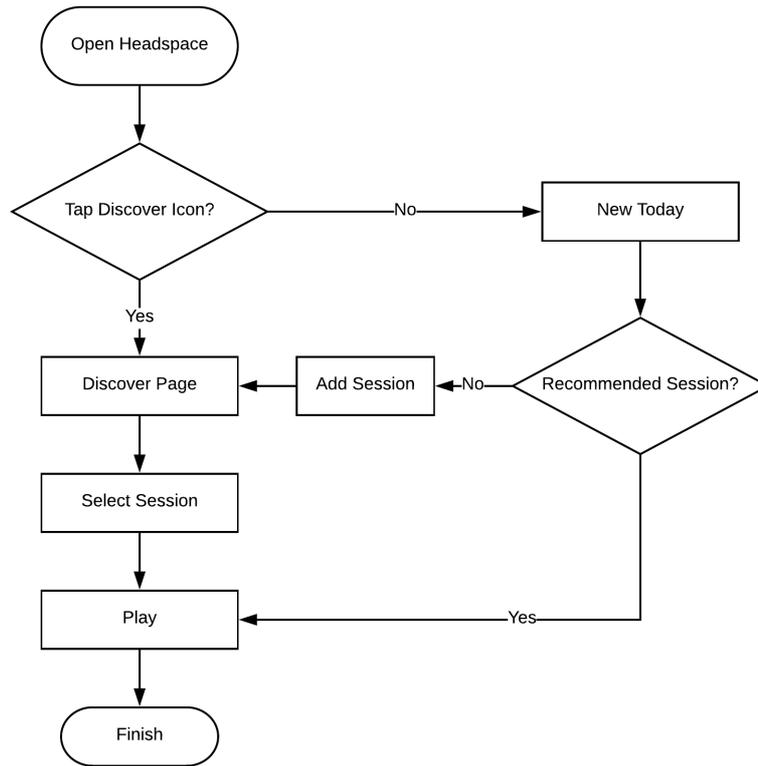


Figure 25. The process of playing a session in Headspace. From Headspace (Version 3.21.0). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Headspace.

As shown in Figure 25, there are two decisions from opening Headspace to playing content. The user can browse on the Discover page or select a course on another page.

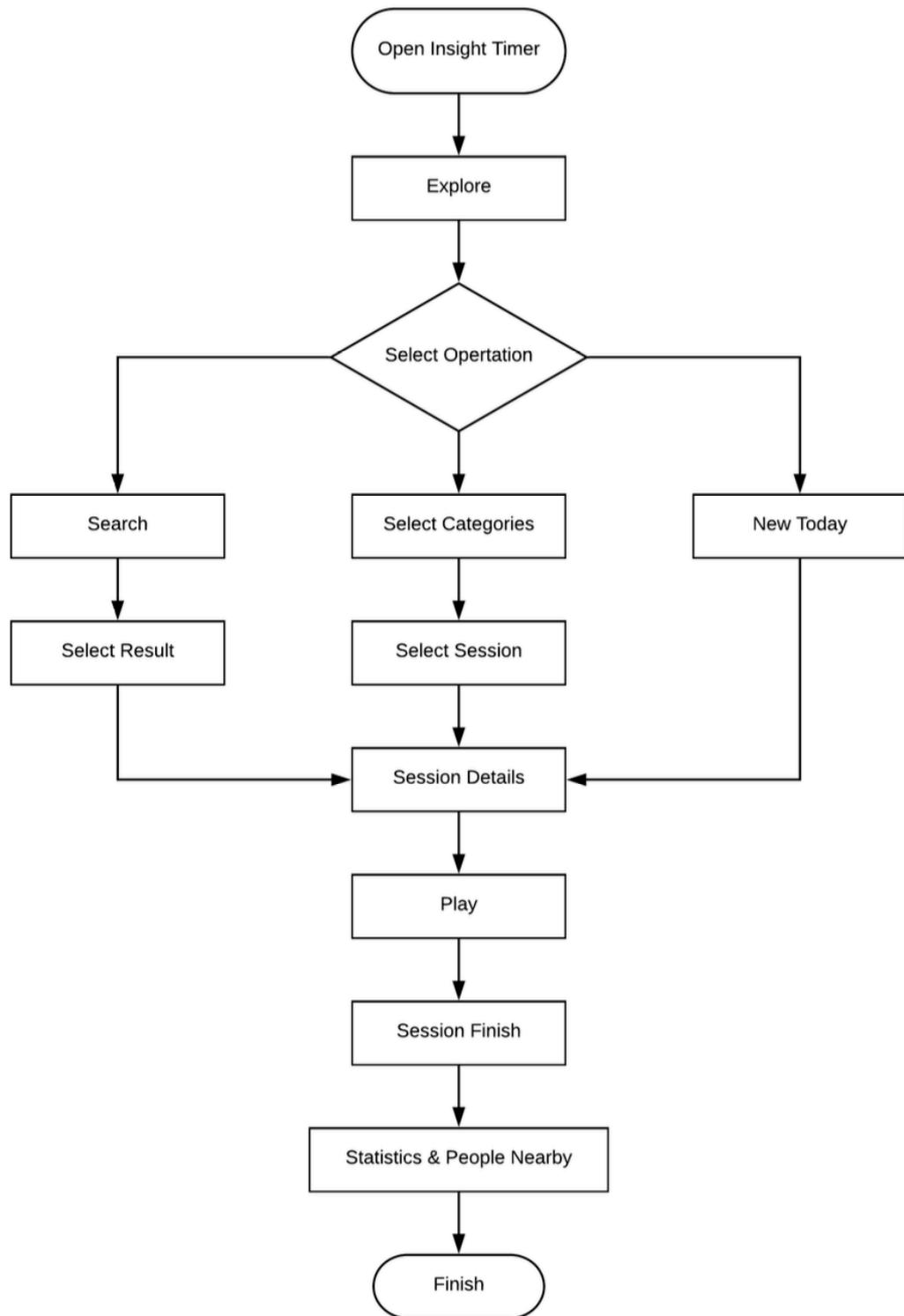


Figure 26. The process of playing a session in Insight Timer. From Insight Timer (Version 12.2.32). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Insight Timer.

Figure 26 describes the interaction process for Insight Timer. It provides users with three

different ways to select a session. After the session is finished, statistics and nearby users are displayed.

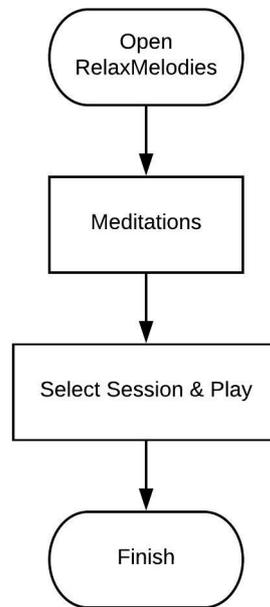


Figure 27. The process of playing a session in Relax Melodies. From Relax Melodies (Version 6.2). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Relax Melodies.

The interaction process for Relax Melodies is relatively simple. As shown in Figure 27, the content is not categorised. When a session is selected, it plays automatically.

4.6 The skeleton plane of the four apps

According to the analysis model mentioned in the Methodology section, the main content of the skeleton plane is information design, which consists of interface design and navigation design. The task of this plane is to arrange the information, such as buttons, images, and text so the user can quickly and efficiently find the information needed to operate the app. The following content will explore the design of the four selected mindfulness apps on the skeleton plane using the prototype map.

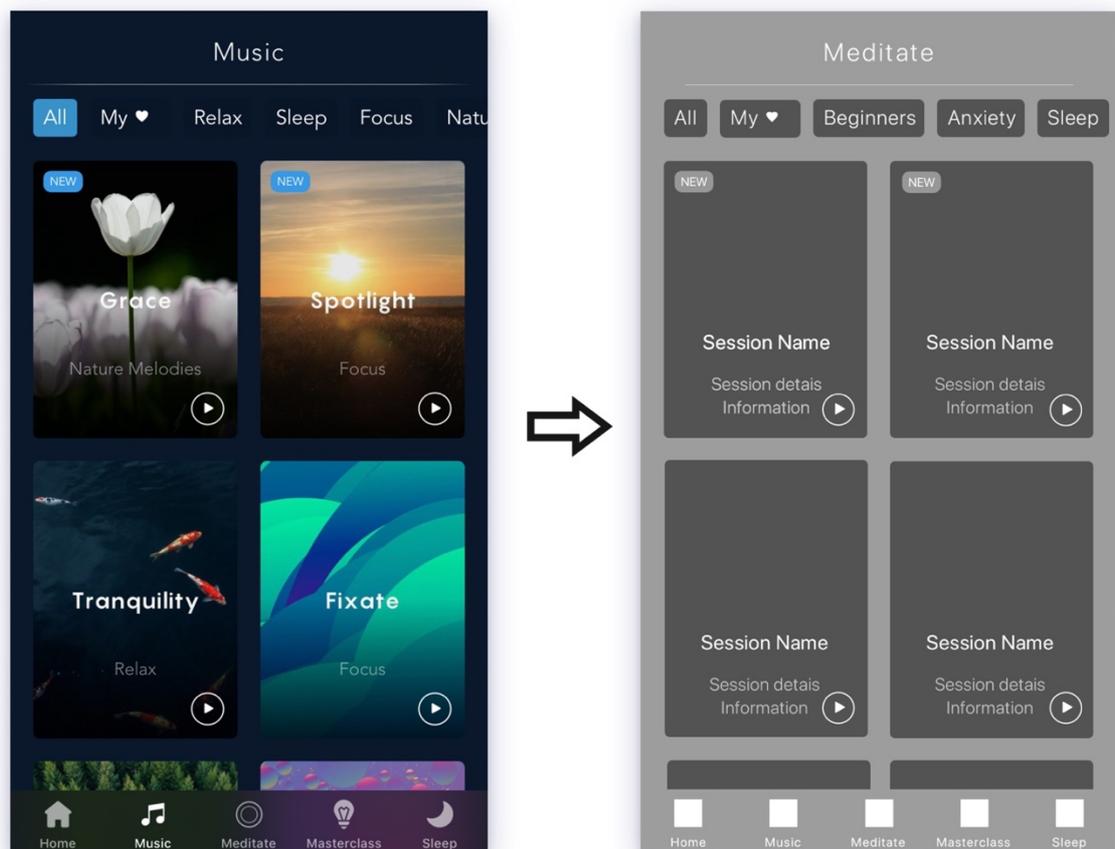


Figure 28. The prototype for Calm. From Calm (Version 3.15.1). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Calm.

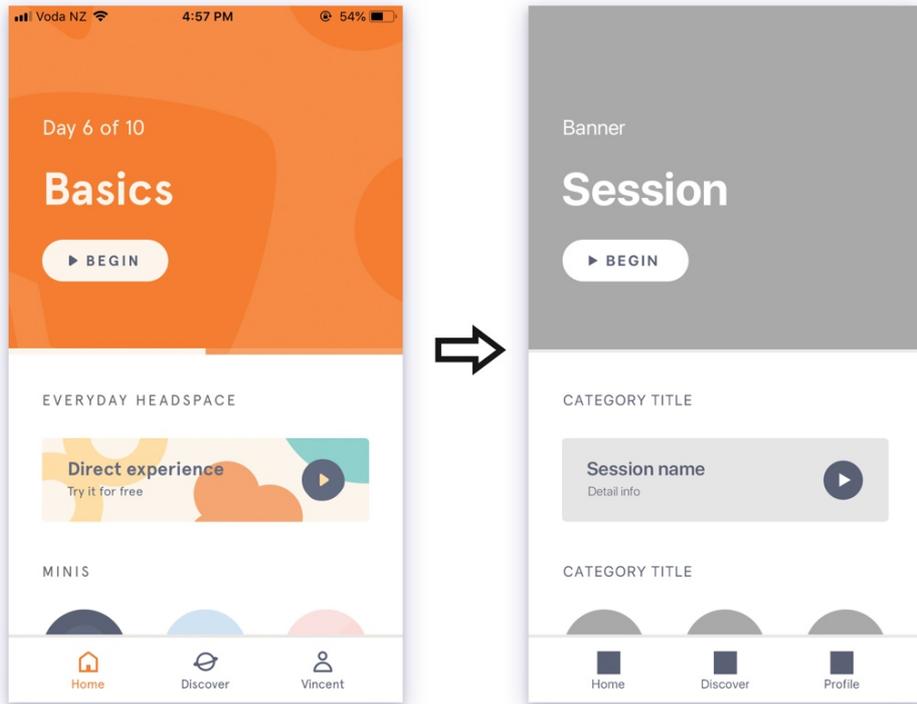


Figure 29. The prototype for Headpace. From Headpace (Version 3.21.0). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Headpace.

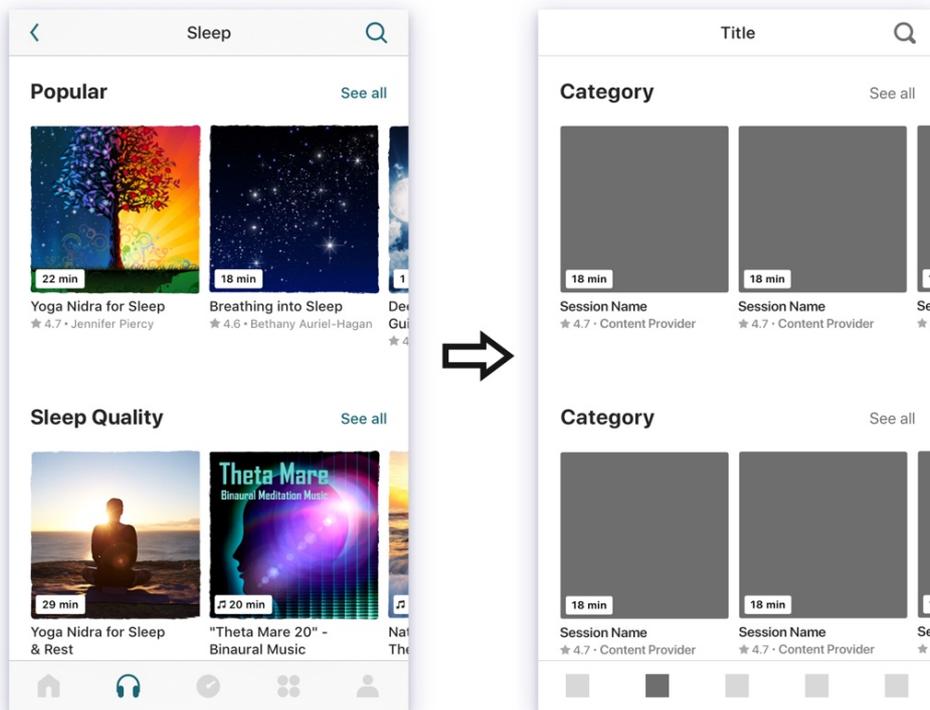


Figure 30. The prototype for Insight Timer. From Insight Timer (Version 12.2.32). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Insight Timer.

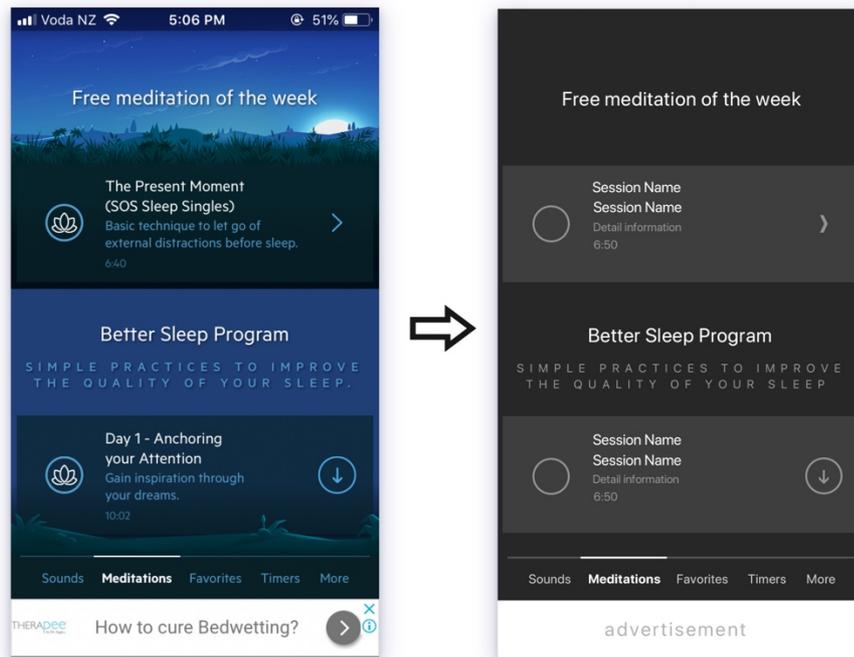


Figure 31. The prototype for Relax Melodies. From Relax Melodies (Version 6.2). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Relax Melodies.

The images on the right-hand side of the above figures are the prototypes of the app interfaces on the left-hand side. From these prototypes, we can see that Calm (Figure 28) and Insight Timer (Figure 30) use a card-like design, which means the name and details of the session are placed on the card, and the cards are arranged within the page using the same spacing. Figure 29 shows that Headspace uses a combination of card-like designs and banners. In Relax Melodies (Figure 31), the information is arranged in a list on the page.

Regarding navigation design, the four apps put the function classification at the bottom of the tab bar, but the designs are different. Calm and Headspace use icons and text descriptions, Insight Timer only uses an icon, and Relax Melodies use only text. In terms of content navigation design, Headspace and Insight Timer both use category titles to

guide users to select content, while Calm uses category cards at the top of the page to display the information.

4.7 The surface plane of the four apps

Products in the surface plane through visual design to achieve the user experience at this plane. This section will explore the visual style and page layout of the four apps to find their visual design on the surface plane.

4.7.1 Visual style

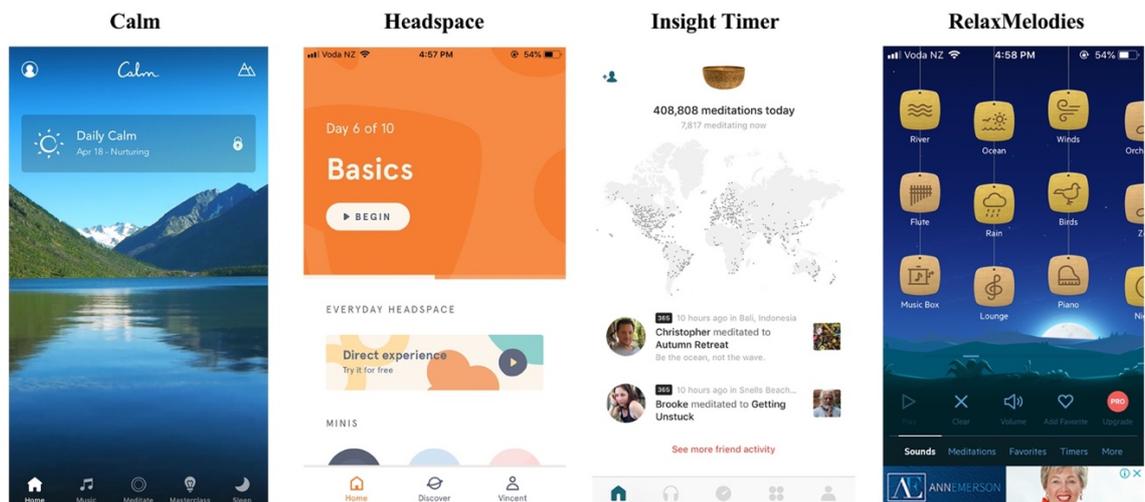


Figure 32. The comparison of the visual style of the four apps. From Calm (Version 3.15.1), Headspace (Version 3.21.0), Insight Timer (Version 12.2.32), Relax Melodies (Version 6.2). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Calm, Headspace, Insight Timer, Relax Melodies.

The visual design reflects the first impression and overall visual experience that the designer of the app wants to convey to users. As shown in Figure 32, the different features of the four apps also have different visual styles.

The visual style of Calm reflects a natural and calm feeling, and this is the meaning of

the name of this app. Some visual elements in the page also have the effect of enhancing the overall visual effect, such as the icon of the mountain in the upper right corner and the icon of the sun in the middle of the page.

The visual style of Headspace is humorous and lively, and this feeling is consistent with the fact that this app uses illustrations for its information descriptions. Both the background colours on the page and the icon colours that are bright orange, and the area of the page gap was large. The font does not use a default font, but uses a designed font, increasing the word spacing. These design details convey a relaxed and lively feeling.

Insight Timer uses a lot of text in its interface. A map is set up on the homepage to show that users in many regions of the world use this app. The number of users is displayed at the top of the page, and the user's course information is displayed at the bottom. The experience conveyed by this visual effect is consistent with the social function of the app.

The visual style of Relax Melodies is based on the theme of sleep. The overall colour adopted by the interface is the colour of the night sky. The background uses the image of the moon to match the main function of the app, which is using music to assist sleep. The visual design of the buttons used to select sounds has a similar visual feel to a game. The app does not use the same design method as the other three apps to display the content.

4.7.2 Visual layout

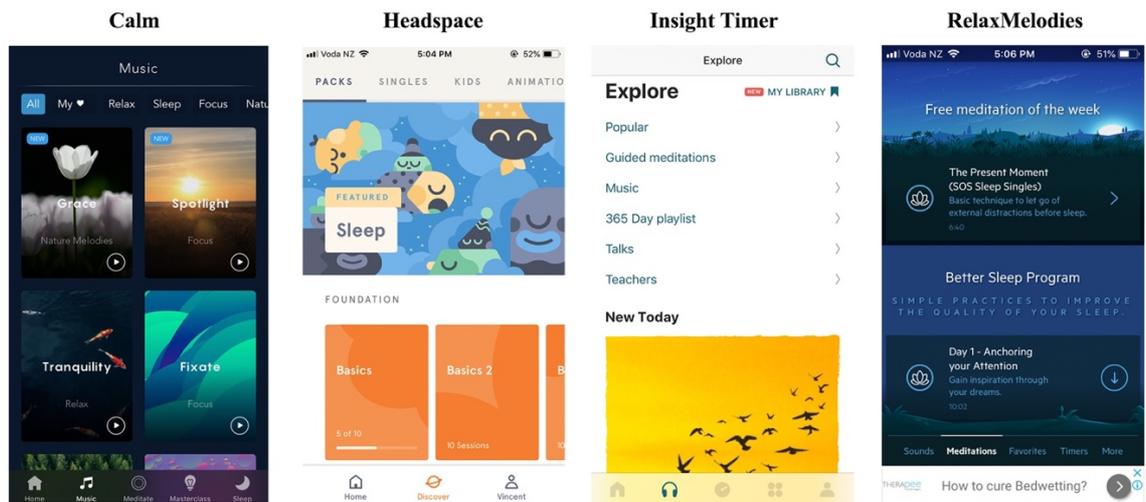


Figure 33. Comparison of the visual layout of the four apps. From Calm (Version 3.15.1), Headspace (Version 3.21.0), Insight Timer (Version 12.2.32), Relax Melodies (Version 6.2). Retrieved from <https://itunes.apple.com>. Copyright 2018 by Calm, Headspace, Insight Timer, Relax Melodies.

Figure 33 shows the layout of the visual information within the four apps. Each of the four apps shows the main functions at the bottom of the tab bar. In Calm, Headspace and Insight Timer, the icon is placed at the default location on the tab bar, but Relax Melodies replaces the default location with an advertisement. The layout of Calm and Headspace is similar. The upper part shows the classification label, which can be swiped. The difference is that the cards in Calm can slide up and down while Headspace supports left and right slides and sliding up and down. A feature of Insight Timer is the addition of a search icon. Recommended sessions are shown below the category list, and a large area of cards are used for display. The page layout of Relax Melodies is different from the other three apps. It is neither a card design nor a list design, and the arrangement of text information uses many different methods on the same page.

5. Discussion

This chapter will analyse the data in the findings to understand the basic needs and usage habits of users of mindfulness apps. The results of the analysis provide support for the next phase of the app development and help to avoid duplication and similarity between the app prototype and existing mindfulness apps. The following content will summarise and analyse the data of the four selected apps using the five planes of the elements of the user experience model.

5.1 The strategy plane of the four apps

All four apps attract users by providing mindfulness online practice services or other related functions. However, the profitability methods are different. Calm and Headspace provide free basic courses to develop user interest in the product, and courses taken after the beginning course will be charged for. This approach helps users understand the content of the course and improve the retention rate. The first session in Insight Timer is free. Its purpose is to attract a large number of users by providing free resources and to improve the opportunities for the payment timer function to be used. Users of Relax Melodies need to pay to unlock all content and it displays an advertisement at the bottom of the page. This type of advertising is very unfriendly to the user experience; popular products rarely use this approach.

5.2 The scope plane of the four apps

The four apps have different features and contain different functional content. Content settings reflect the features of the apps. The main function buttons of the four apps are placed on the bottom tab bar. A card-type design is used to display most of the information content. This design method caters to usage habits and helps users understand the product. Good design of the operational flow can reduce operational steps and improve the operational efficiency.

5.3 The structure plane of the four apps

In the structure of the four apps, the number of menu layers determines the steps that the user needs to go through. Branches under the same category represent the number of options available for selection. The number of menu levels and branches reflects the complexity of the app content. Good classification can improve the operating efficiency.

5.4 The skeleton plane of the four apps

In the low-fidelity prototype, the information arrangement affected the operating efficiency. The four apps use a card-like design to classify the content using different navigation designs. The Insight Timer and Headspace apps use category tags to arrange the content. Relax Melodies has fewer courses so does not use category tags. In Calm, all

the navigation tabs are arranged at the top, which makes it difficult for users to find the tabs that are hidden in the interface. Different navigation styles need to be designed according to the characteristics of the content.

5.5 The surface plane of the four apps

Regarding visual style, the four apps used different visual styles to highlight different features of the product. The design of the picture had a significant influence on the visual style of the product, and the distance between the fonts also changes to adapt to the content. The unified visual style of each element in the page constitutes the overall visual effect. In terms of visual layout, a unified layout method can reduce the difficulty for users in selecting options and keep the interface simple thereby improving the operating efficiency.

6. App prototype development

The purpose of developing the app prototype was to offer an information platform for mindfulness app users to connect online and offline mindfulness activities. This section describes the process and design methods for developing the app prototype. It consisted of four phases: (1) app structure, (2) low-fidelity prototype, (3) high-fidelity prototype, (4) display and operation.

6.1 Phase one: app structure

According to the elements of user experience model (Garrett, 2002), the structure of the app is determined by the strategy of the product. The strategy includes the needs of users and the goals of the product. The user needs for this study were derived from the results of the case studies in the previous chapter. The goal of the product was the purpose of this study. According to the strategic content of the app prototype, the functional structure of the app prototype consisted of five major parts. They were (1) offline mindfulness activities, (2) online mindfulness classes, (3) background music, (4) social connection and (5) profile. These function names were simplified to make it easy for the user to identify and understand. The simplified names were outdoor, library, music, community and profile.

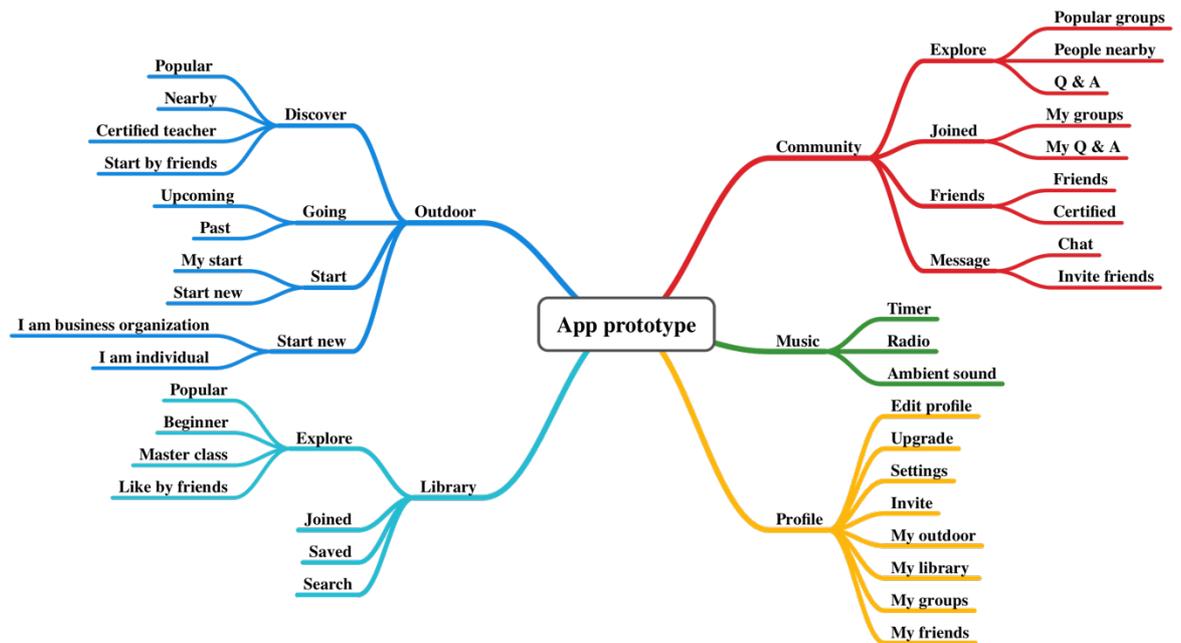


Figure 34. The app prototype structure. Made by author.

After determining the functional requirements of the app prototype, as shown in Figure 34, the structural details of the app prototype were designed using the mind map software. The outdoor function was ranked first because the purpose of the app prototype was to connect online and offline mindfulness activities. According to the study on co-creation in the literature review section, the participation of users in the creation of the activity content can increase the enthusiasm of the participants and promote the development of the content, so the function of starting new activities was set in the outdoor function module. The function of starting new activities allowed users to create new activities to enrich the content of the platform. This function provided users with more choices of online platforms to find offline mindfulness activities. The functions of library and music can meet the needs of online mindfulness training. Based on the analysis of the four selected apps in the case studies, the number of content categories and the number of menus affects the efficiency of user selection, so the number of secondary menus within

the structure of the app prototype did not exceed four. The information in the app prototype structure provides the evidence for the next step in designing a low-fidelity prototype.

6.2 Phase two: low-fidelity prototype

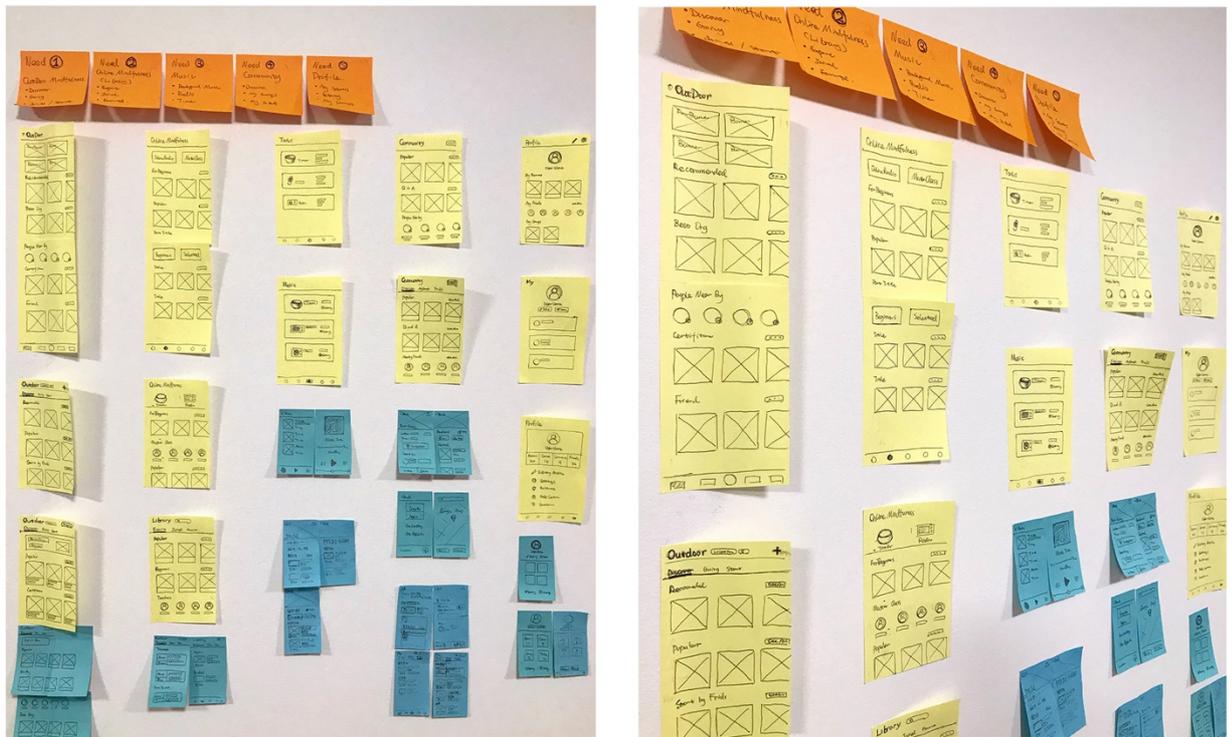


Figure 35. Iteration of the low-fidelity prototype. Made by author.

After the functional structure of the prototype was designed, the functional modules could be arranged in the low-fidelity prototype. As shown in Figure 35, paper labels were used to plan the content of the low-fidelity prototype. As seen through the results of the case studies in the previous chapter, a card-like design meets the habits of mindfulness app users. Therefore, a card-like design was used in the low-fidelity prototype. In the paper

labels, the paper cards were the first iterated version of the upper interfaces. Further iteration and optimisation of the paper card prototype was the basis for the more accurate prototype in the next step.

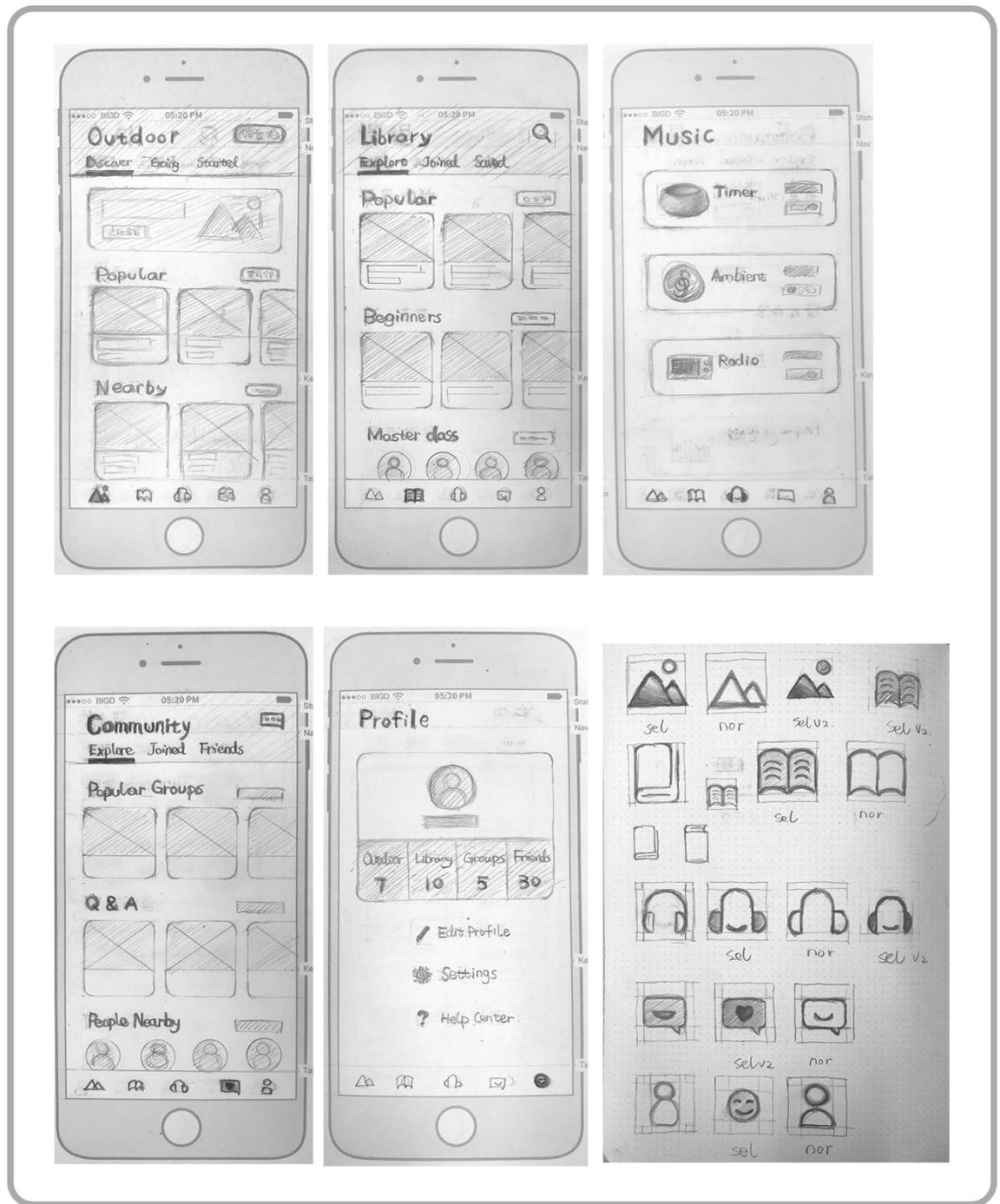


Figure 36. Hand drawing of low-fidelity prototype. Made by author.

After the basic function layout was determined, a hand-painted method was used to draw the interface effects (Figure 36), and hand-drawn drafts of the icons were designed. These hand-drawn drafts were prepared for the next step of drawing the prototypes using software.

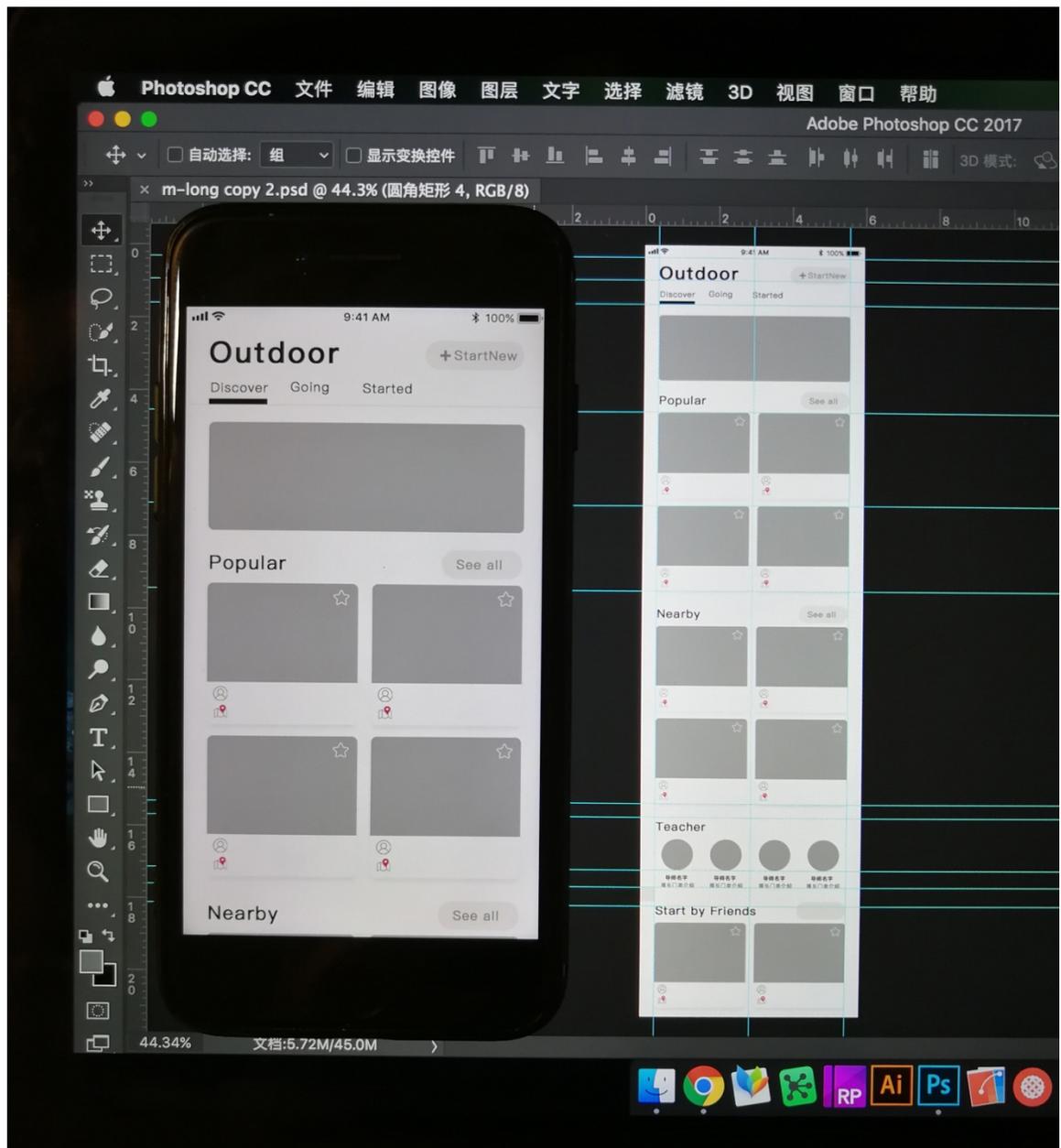


Figure 37. Low-fidelity prototype displayed in Photoshop. Made by author.

For optimisation of the hand-drawn prototype, this study used Photoshop to draw the low-

fidelity prototype. The module positions on the page were sorted using the grid lines of the software to ensure the same position of the same function module to achieve a neat visual effect. As shown in Figure 37, the prototype was imported into the mobile phone to check the visual effect, and the low-fidelity prototype was optimised and iterated according to the effect of the display.

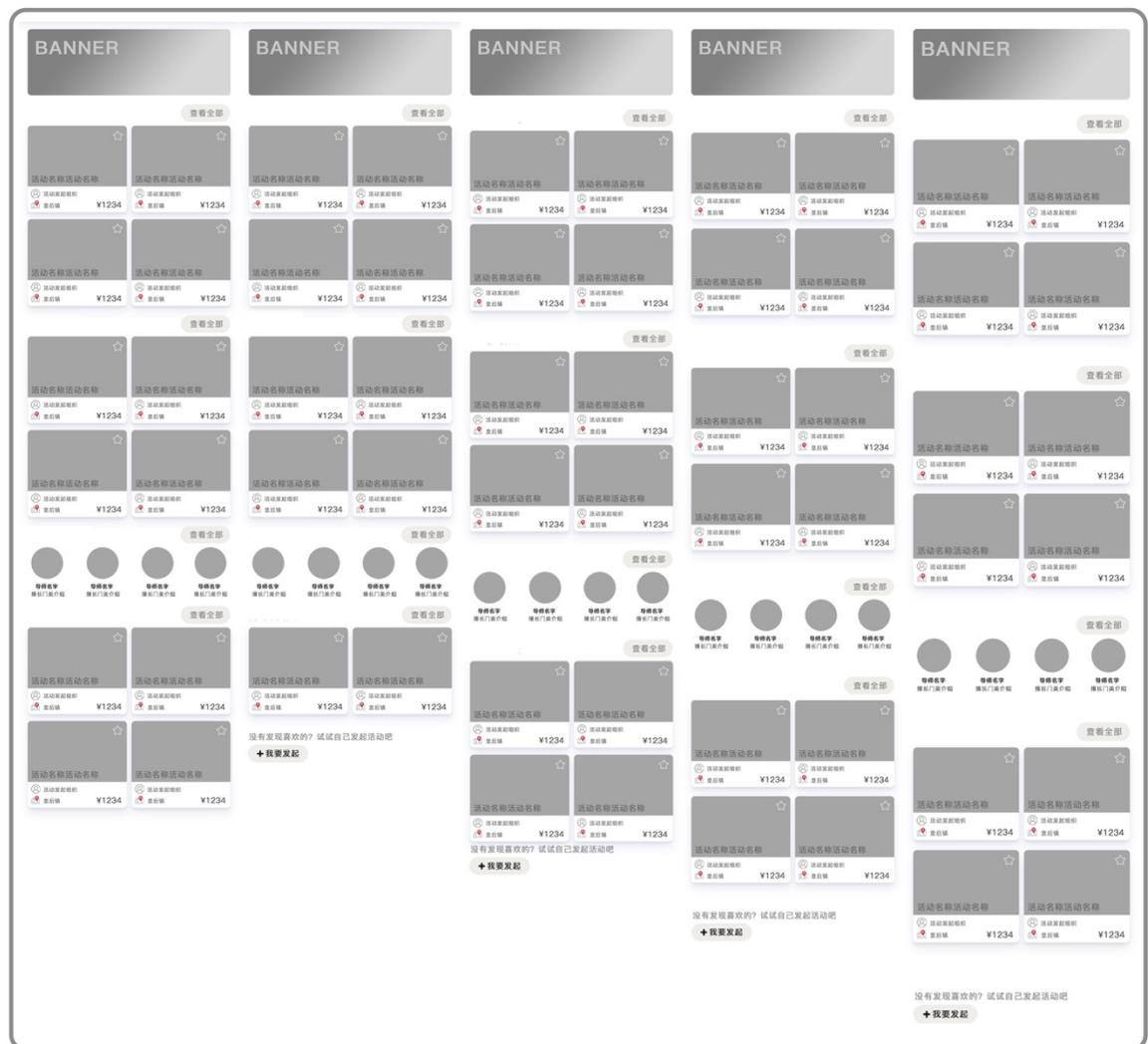


Figure 38. Iteration of the low-fidelity prototype. Made by author.

Figure 38 was the process of iterating the low-fidelity prototype. The iterations included improvements to the location and functionality of the modules. After adjusting and

iterating other sub-pages using the same method, the high-fidelity prototype could be drawn to improve the accuracy of the app prototype further.

6.3 Phase three: high-fidelity prototype

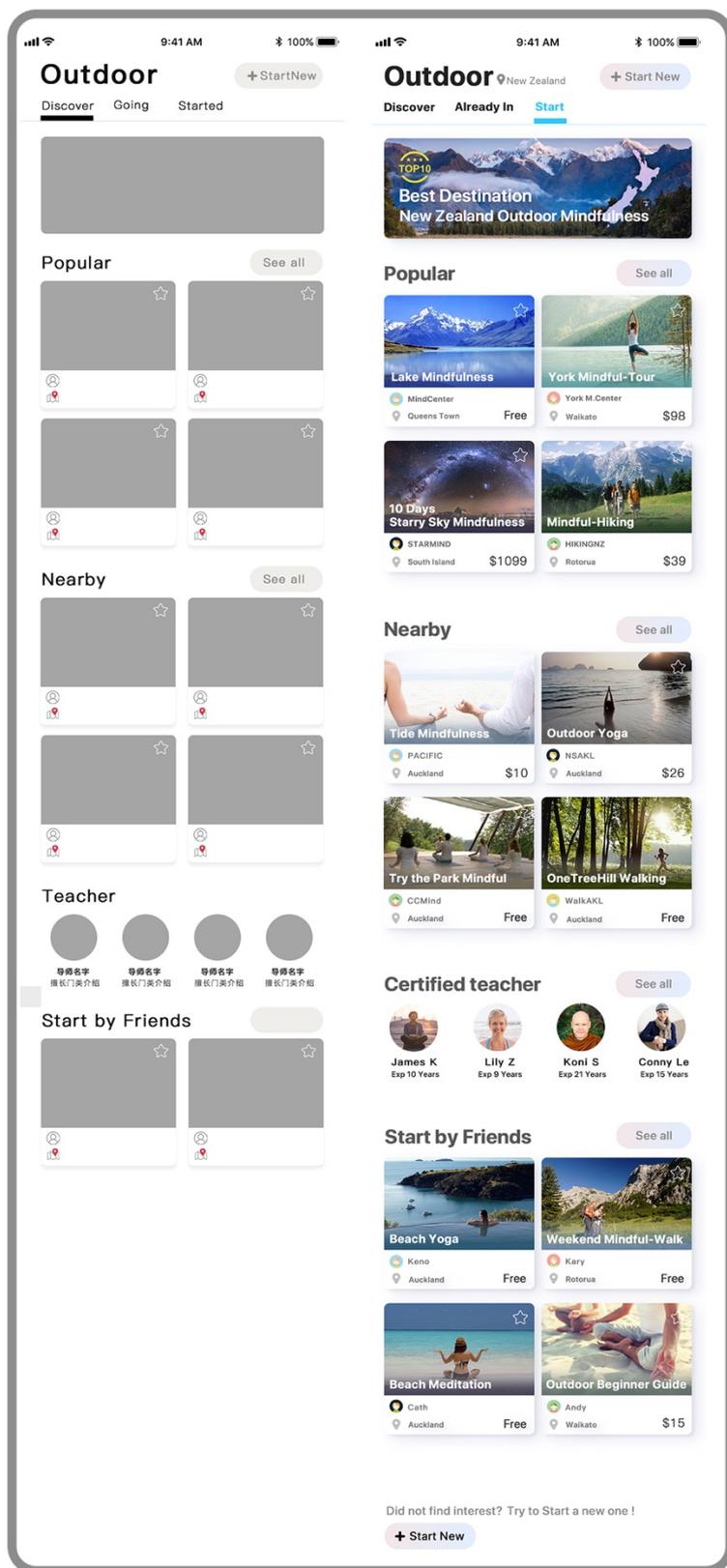


Figure 39. High-fidelity prototype designed from low-fidelity prototype. Made by author.

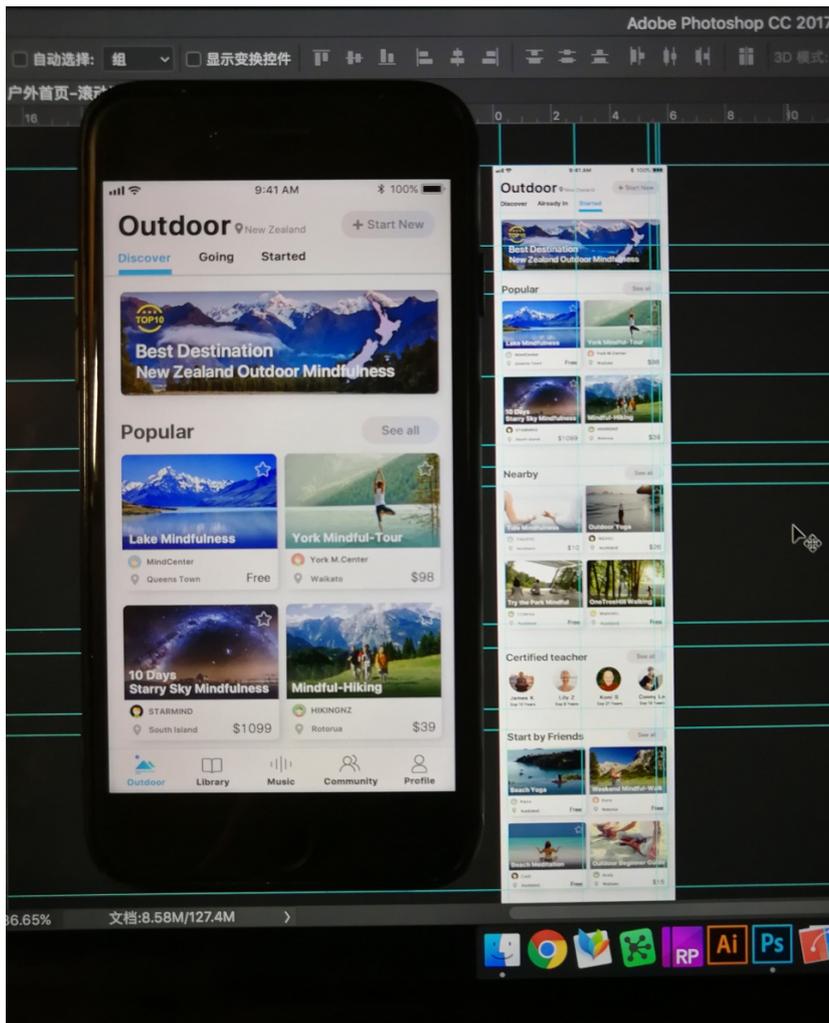


Figure 40. Checking the visual effect. Made by author.



Figure 41. Iteration of profile interfaces. Made by author.

As shown in Figure 39, the high-fidelity prototype on the right was the optimisation and improvement of the low-fidelity prototype on the left side after importing the high-fidelity prototype into the mobile phone to check the visual effects of the prototype (Figure 40). The interface was continuously optimised based on visual feedback and product features. Figure 41 shows the iterative process of creating the profile interface, representing the iterations of colour matching, function, and position. According to the results of the case studies in the previous chapter, the visual style should be consistent to express the characteristics of the product, so the colour scheme of Figure 41 was optimised to maintain the features of the app prototype.

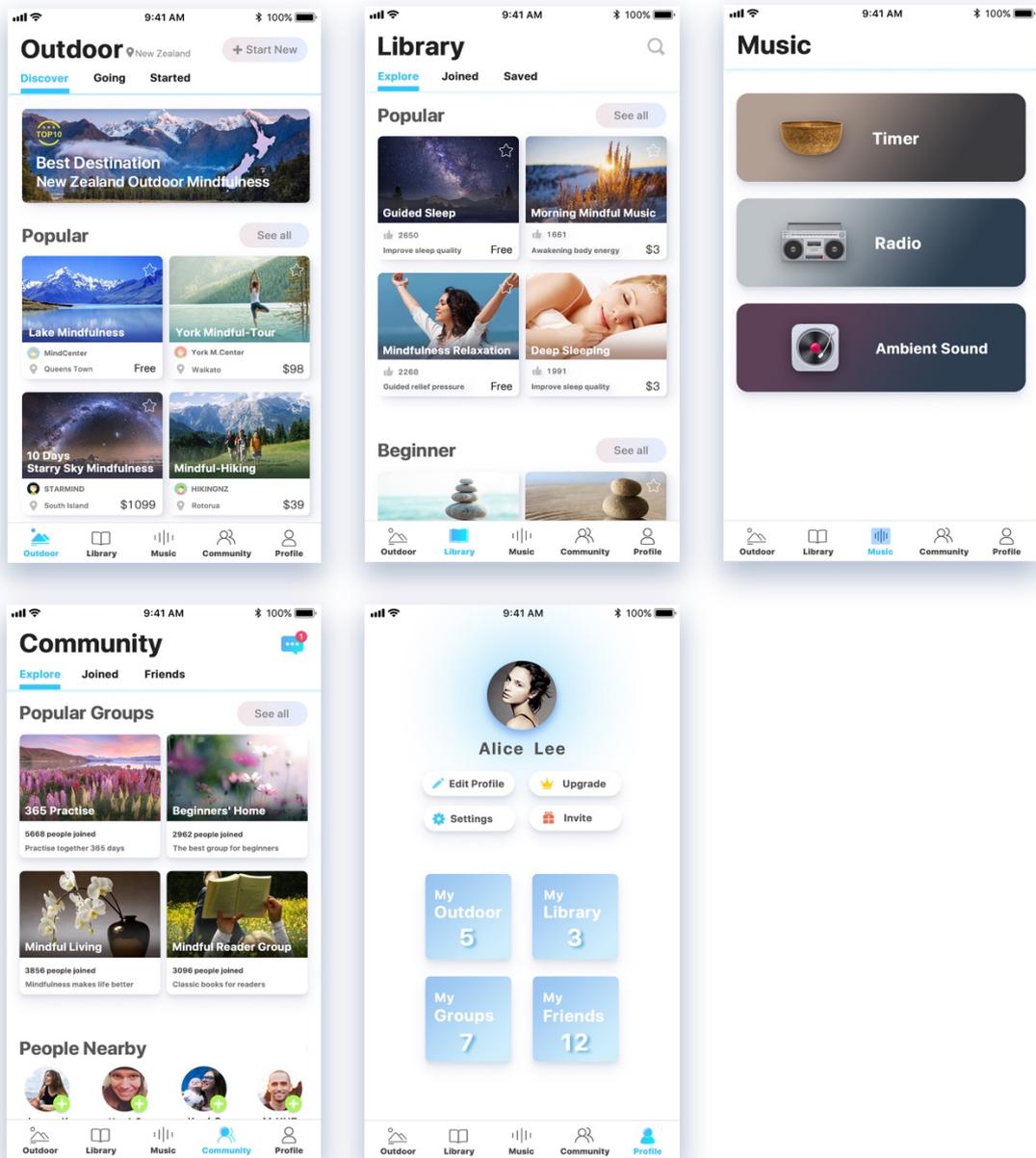


Figure 42. The visual effect of the high-fidelity prototype. Made by author.

Figure 42 shows the visual effects of the high-fidelity prototype being iterated. The unified visual style and functional modules were beneficial in improving the operating efficiency.

6.4 Phase four: functional demonstration

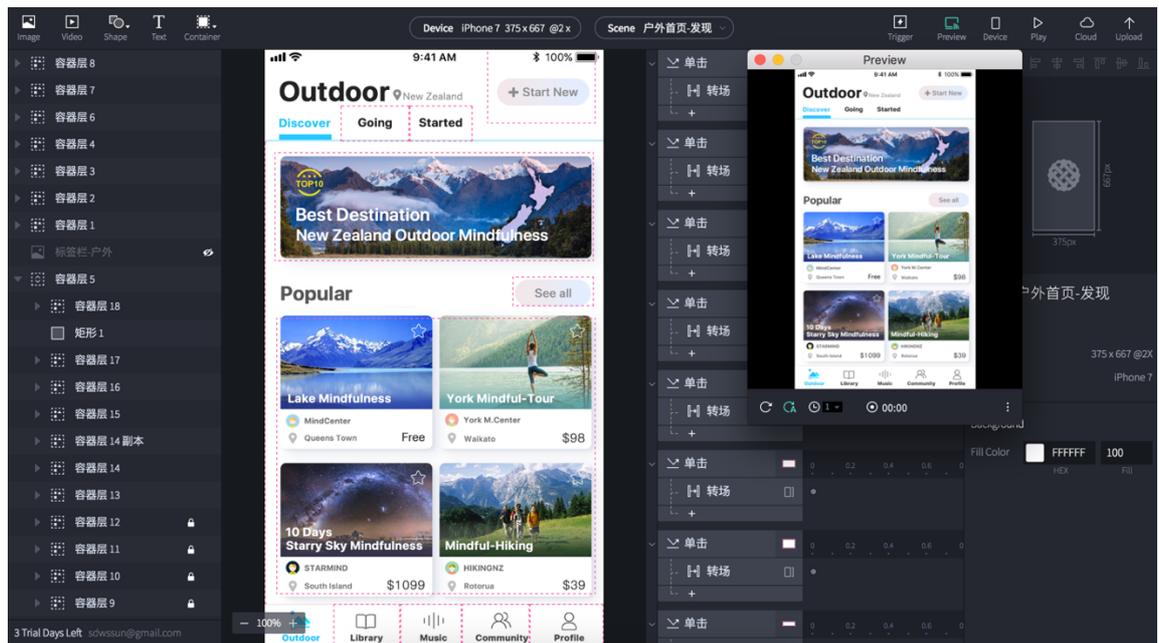


Figure 43. Display of high-fidelity prototype. Made by author.

Importing high-fidelity prototypes into the interaction design software called Protopie can demonstrate the high-fidelity prototypes (Figure 43). Interactions between interfaces were designed to achieve the functionality and purpose of the app prototype. This section describes the operational flow of the app prototype to illustrate how the functionality of the prototype was implemented.

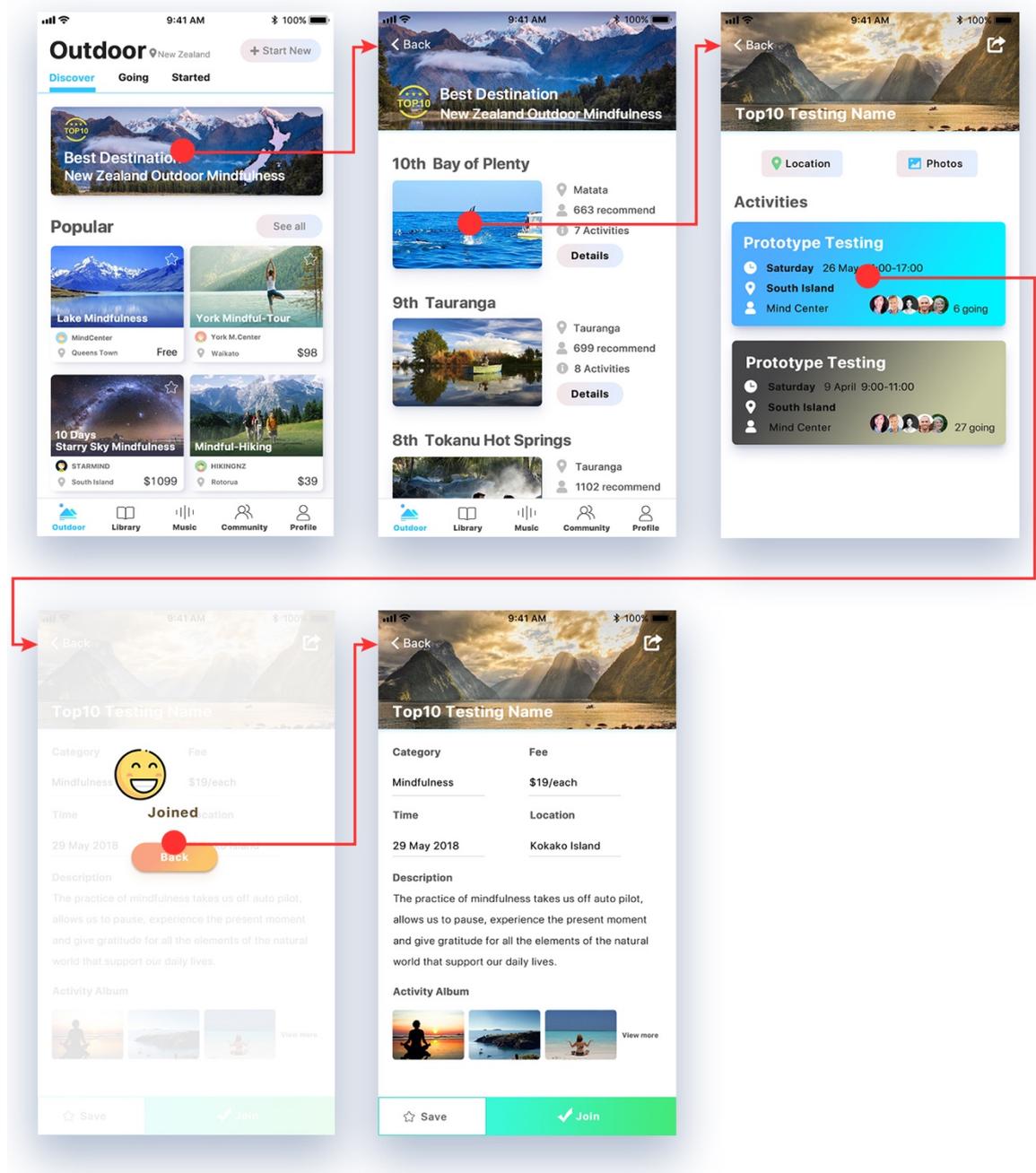


Figure 44. The offline mindfulness activity functions. Made by author.

Figure 44 shows the functions of the offline mindfulness activities in the app prototype. Users can search for offline mindfulness activities through banners or categories in the outdoor discover menu. The titles of the categories include Popular, Nearby, Certified Teacher and Start by Friends. Activities with a large number of participants are displayed in the Popular category, and activities at a close distance are displayed in the Nearby

category. Mindfulness organisations and teachers are displayed in the category of Certified Teacher after passing platform authentication. The category of Start by Friends displays the content started by friends.

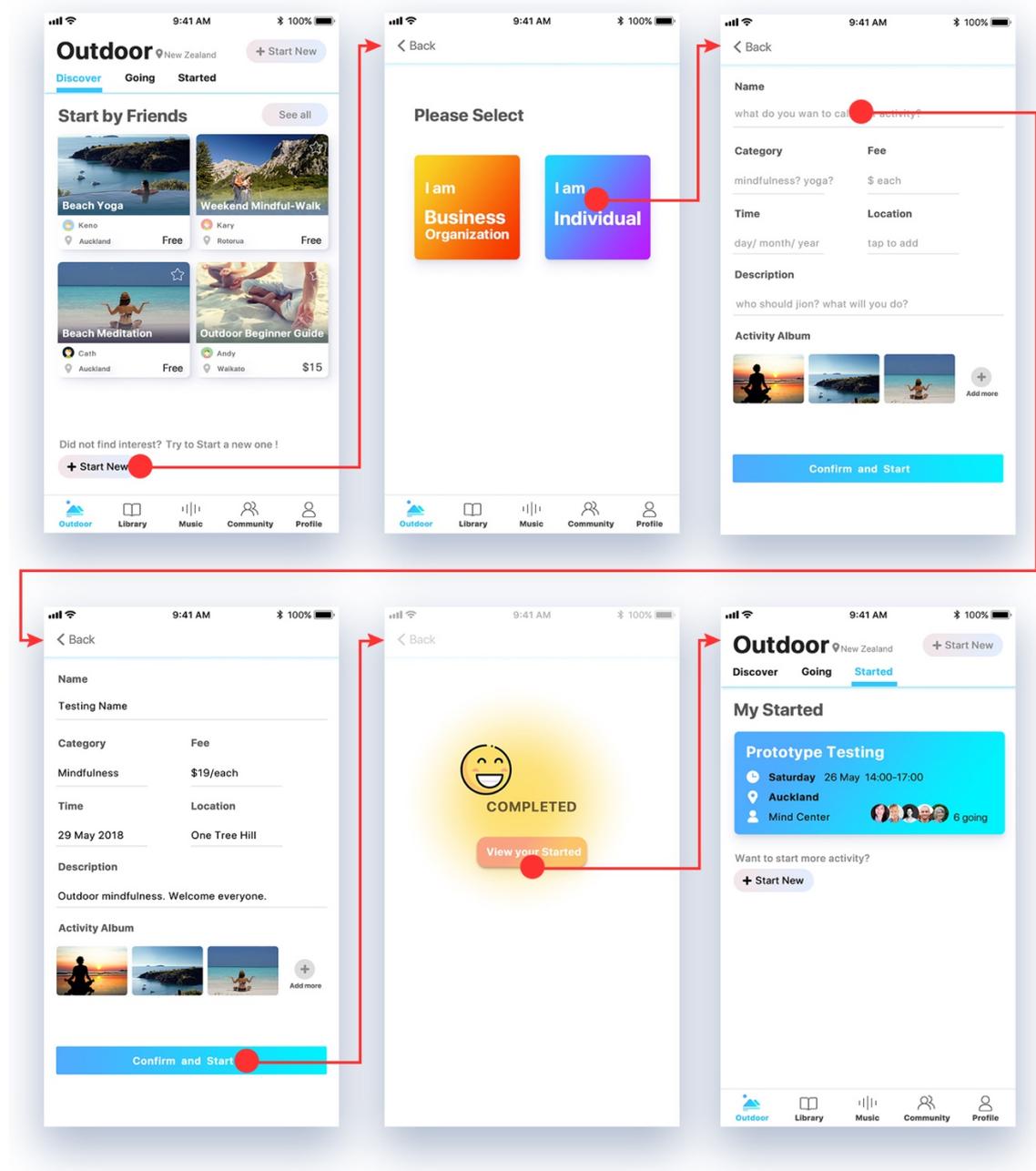


Figure 45. The function of starting a new activity. Made by author.

Users can start a new mindfulness activity as a founder. As shown in Figure 45, the button of Start New activity is displayed in the upper right corner of the interface. If the user

does not select content after browsing all categories, the button to start a new activity, shown at the bottom of the page, can remind the user to initiate a new activity. After the activity begins, the founder can click on the tab above the page to view the activity. The app prototype classifies activities based on factors such as the location of the event and the participants so that users and friends can quickly join the activity.

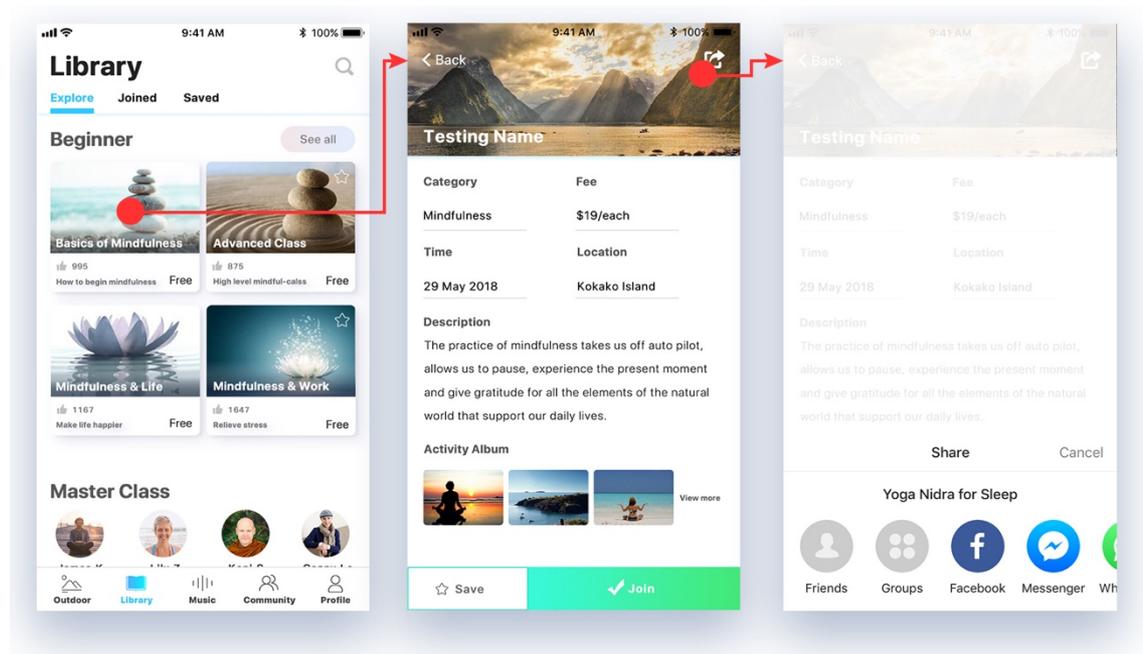


Figure 46. Sharing online mindfulness classes. Made by author.

Through previous research, it has been found that online mindfulness training is the basic function of mindfulness apps and the basic need of mindfulness app users. As shown in Figure 46, the app prototype of this study not only satisfies the basic function but also adds a sharing function to promote the connection between the function of online mindfulness and the function of community.

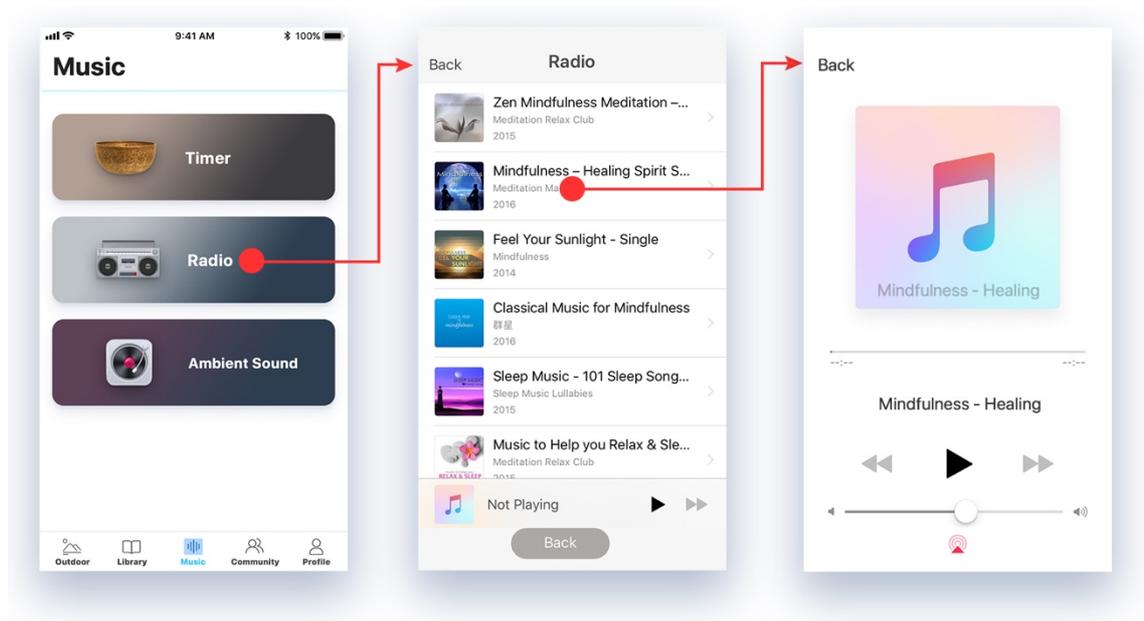


Figure 47. The music function. Made by author.

The music function plays an important role for mindfulness app users, which is confirmed by previous studies. As Figure 47 shows, the app prototype of this study includes three functions related to music, namely timer, radio, and ambient sound. These three functions provide the sound environment that users need to improve the quality of their mindfulness.

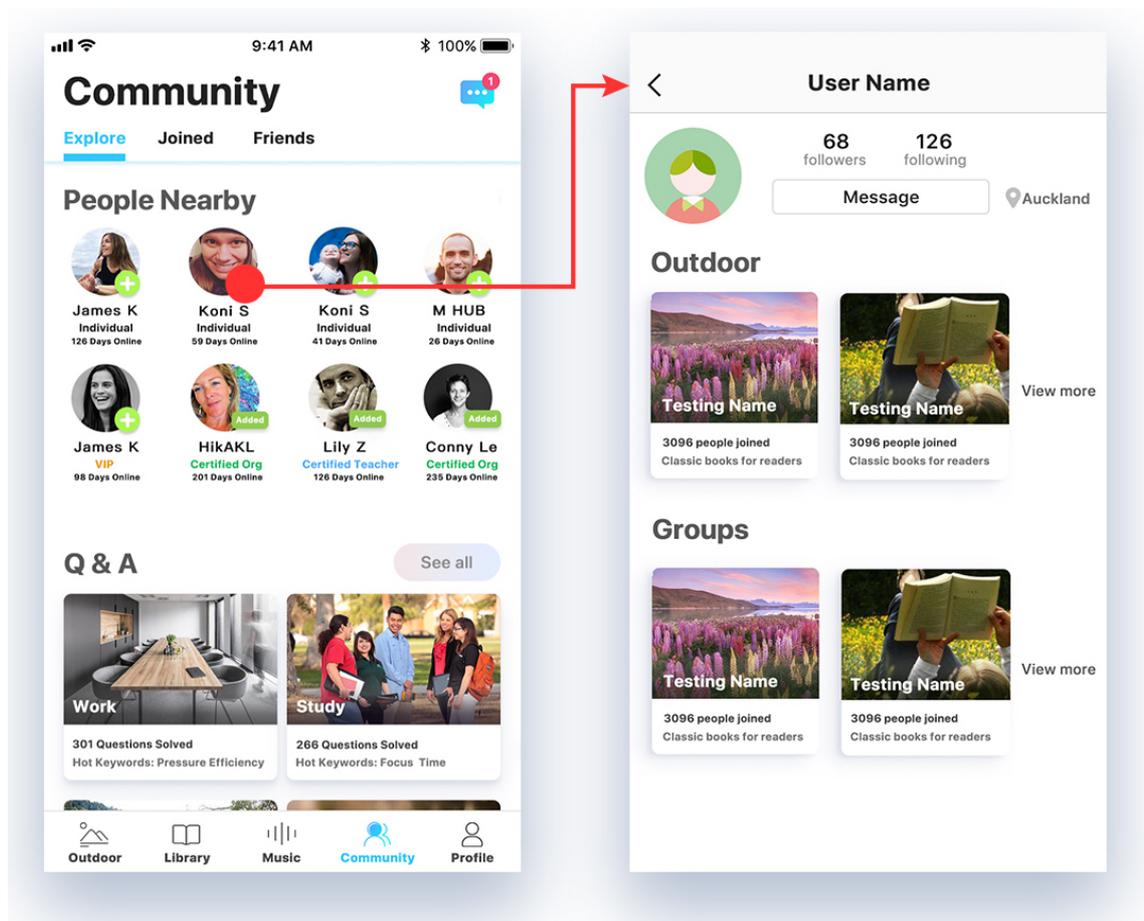


Figure 48. The community function. Made by author.

The community function includes People Nearby, Q&A and popular groups. Users can use the People Nearby function to find friends in the same city or region. As shown in Figure 48, after the user clicks the Friends icon, the activities joined by friends are displayed, and the user can register the event which the friends have joined.

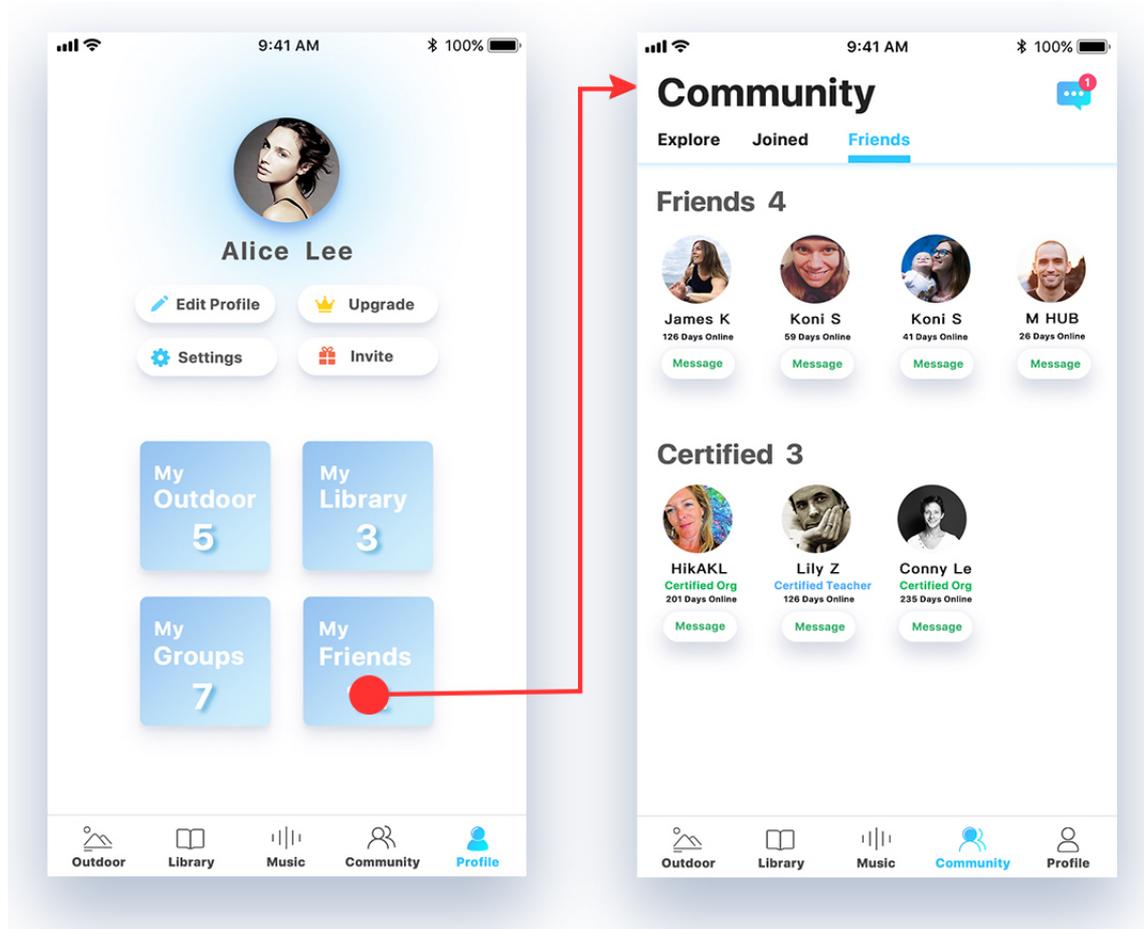


Figure 49. The user profile function. Made by author.

The profile function of the app prototype in this study not only provides the basic functions of editing the profile and settings but also adds the function of activity statistics. As shown in Figure 49, users can tap the Joined button or add friends to switch to the related page.

7. Conclusion

This study is based on the analysis of competitors to improve features of the mindfulness app. These improvements include recommending content to users by setting guiding questions and using the app as an information platform to connect online mindfulness training and offline mindfulness activities. This study provides critical insights and concrete recommendations for the development of mindfulness apps which could support the connection of online-to-offline mindfulness training. The outcome of the research was the prototype of the mindfulness app, which was demonstrated through videos and actual mobile phone operations. The outcome provides a framework for the development of mindfulness apps that could guide further relevant research. In the design process of the app, the specific information display method was iterated many times. Earlier versions had visually ‘busy’ issues, and the improved version optimised the app structure and visuals to improve the quality of the user experience.

The limitation of this study is that it is impossible to research all apps related to mindfulness, and only four apps were selected for detailed case studies, based on the market data about the apps, to reflect the market situation for mindfulness apps as much as possible. The app prototype in this study is a product prototype that has not been developed by the programmer and uploaded to the online app store, so it does not have the full functionality of an app. This prototype is used only as a framework to explore new experiences for mindfulness apps.

In further study, I hope to continue improving the framework of the app prototype through formal user testing, because continuous exploration through further iterations could provide users with a higher quality experience.

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